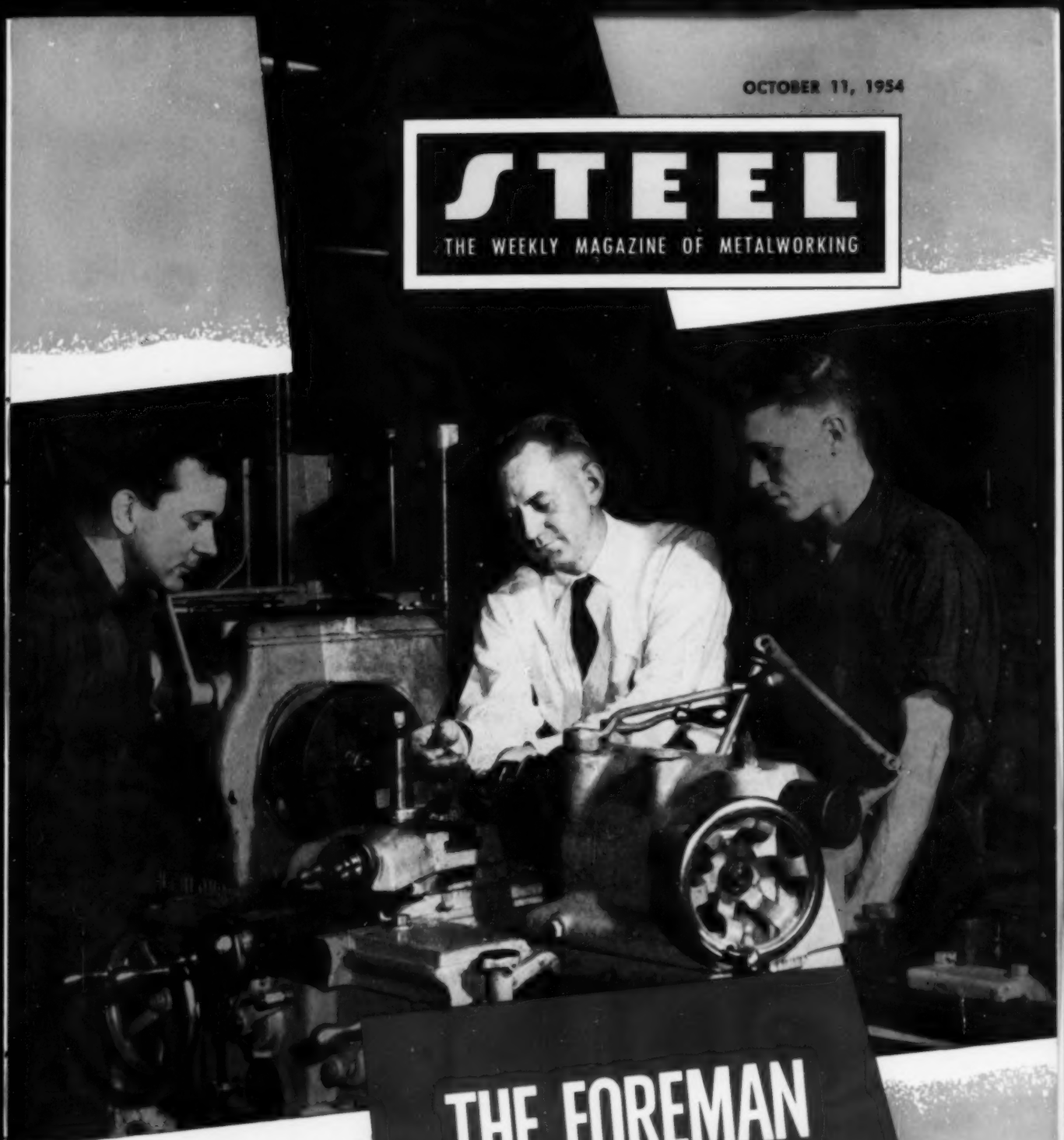
OCTOBER 11, 1954

STEEL
THE WEEKLY MAGAZINE OF METALWORKING



THE FOREMAN

Management on the Production Line

No. 9 in 1954 Management Series

CONTENTS — PAGE 5

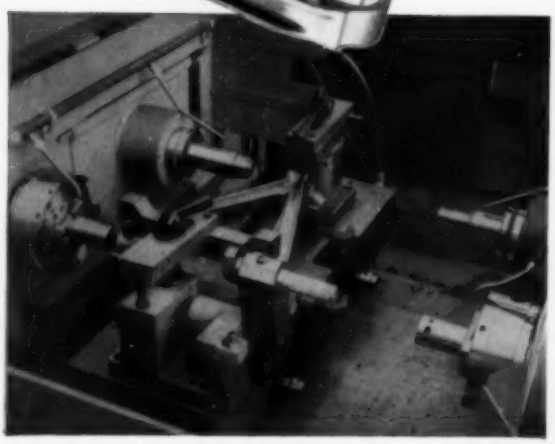
DOWN LIKE A FEATHER!

. . . a little safer, a little smoother because this part was BORIZED*

You're heading for the runway on final approach — fifty tons of airliner hurtling through space at over 100 miles an hour, yet settling to the earth as lightly as a feather. This is the time when a lot of things must work *just right.*

That they do so, thousands of times a day at airports the world over is a real tribute to the aviation industry. Such performance is made possible only through the utmost precision in every step of manufacture. That's why so many parts of the modern aircraft are borized. Here, for example, is a torque arm for a landing gear, borized on a Heald Model 422 Bore-Matic.

Whenever a part is borized, you can be sure of three things. A finer, longer-lasting, precision made part. Important savings in time and production cost. A definite competitive advantage for your product. That's why IT PAYS TO COME TO HEALD.



This Model 422, is used to bore, counterbore and chamfer seven different torque arms for landing gear components. Aligning rails on both the boringhead bridges and the fixture sub-base aid in accommodating the various parts.

Basic fixture equipment consists of angle plate type with swinging gate locator and hand cam clamps — gate locator is interlocked so that machine will not operate unless part is correctly located.

* *Precision finished by a Heald-engineered method on a Heald Bore-Matic.*

THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

THE OBSERVER oversees metallurgical testing of the metal and the slag. The carbometer test, being poured here, determines carbon content, serves as a guide for arriving at the proper analysis.

HE WATCHES temperature-taking with Bethlehem's extremely accurate immersion thermocouple. This reading helps determine the exact time for tapping the heat.

HE'S ON HAND DURING TAPPING to record the data that is so essential for satisfactory metallurgical control. He also computes the amount of deoxidizer to be added to the ladle.

ON THE SPOT when the metal is being teemed into ingot molds, he sees that proper practices are followed, and makes sure that the stream is tight to avoid splashing.

The Fellow Who Follows the Heat

Scrupulous metallurgical control is one of the chief reasons why Bethlehem Hot-Rolled Carbon Steel Bars are *good* bars. And the key man responsible for metallurgical quality-control in the open-hearth department is the observer.

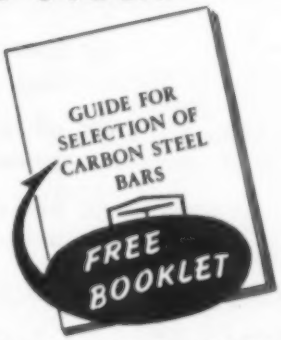
He's the man who literally follows the heat, making sure that high quality standards are adhered to, and proper operating practices followed every step of the way.

This almost fanatic insistence on quality-control in the open hearth – yes, and in the raw-material stockyards, around the blast furnaces and in the rolling mills – results in a product that is uniformly up to end-use requirements.

Why not try Bethlehem Hot-Rolled Carbon Steel Bars? Your order will be promptly handled by the nearest Bethlehem sales office. We suggest that you write them, or give them a call, today.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation



32 pages of information to help the user in some of the important decisions in selecting carbon bars to fit his needs. Includes 6 pages of useful engineering data. Address Publications Dept., Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM HOT-ROLLED CARBON BARS

STANDARD SECTIONS • SPECIAL SECTIONS • BAR SIZE SHAPES

BETHLEHEM STEEL

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portable fire extinguishers . . . built-in fire detecting and fire extinguishing systems

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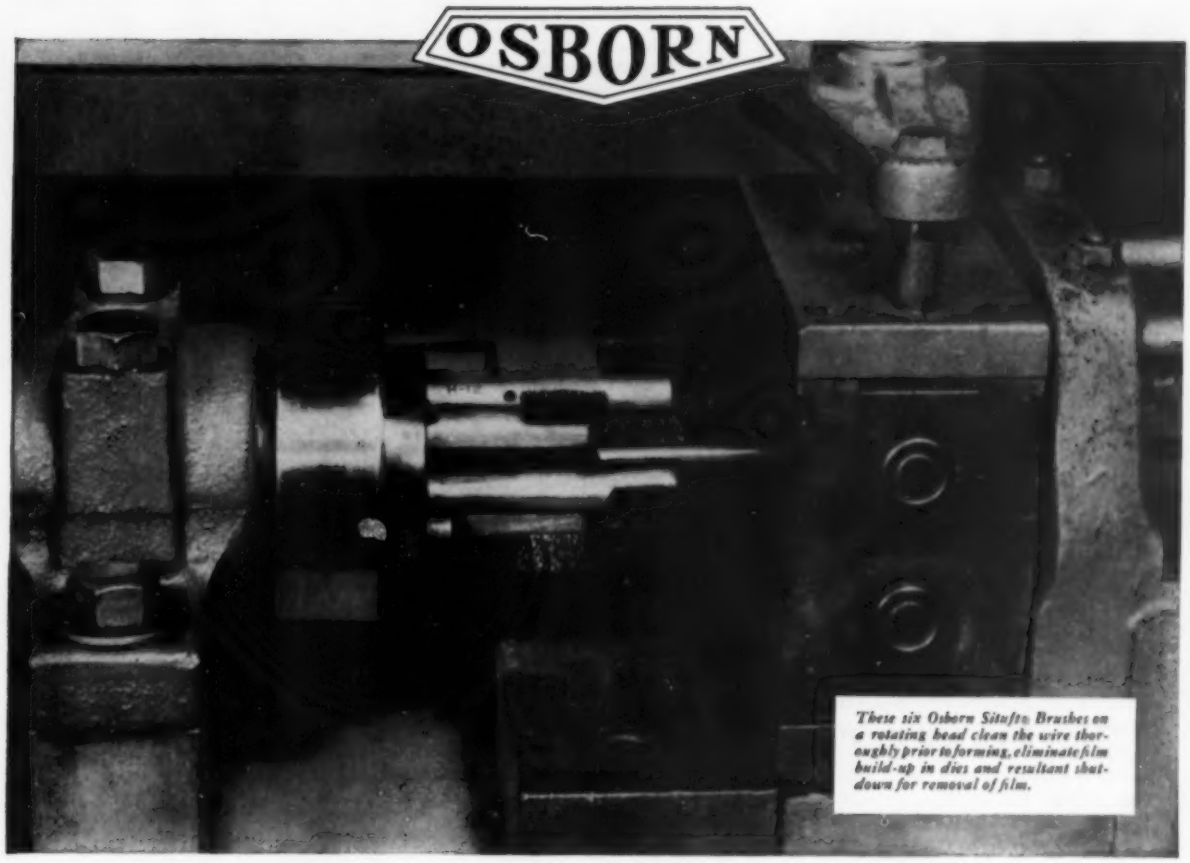

These six Osborn Situfix Brushes on a rotating head clean the wire thoroughly prior to forming, eliminate film build-up in dies and resultant shutdown for removal of film.

Eliminates downtime

HOW CAN YOU SAVE WITH AN OBA?

THE spade weld screws shown here are made from wire. The problem was to clean the wire prior to forming screws. Former cleaning method caused frequent lengthy shutdowns of press for removal of film build-up in dies. Now, the Osborn Power Brushing setup shown cleans the wire thoroughly, eliminates costly downtime.

Your nearby Osborn Brushing Specialist is constantly helping to make savings like this by studying the cleaning and finishing operations in all kinds of plants and giving a written report with recommendations for improvements. Why not have him make this **O**sborn **B**rushing **A**nalysis in your plant? There is no obligation. Call or write *The Osborn Manufacturing Company, Dept. G-24, 5401 Hamilton Ave., Cleveland 14, Ohio.*

Osborn Brushing Analysis

TO HELP YOU DISCOVER HIGHER QUALITY AND LOWER COSTS WITH POWER BRUSHING

use
CRUCIBLE STAINLESS
for
lower overhead

Say good-bye forever to heavy maintenance costs when you specify Crucible Rezistal® stainless steel for such vital building components as roofing . . . gutters . . . downspouts . . . ductwork.

For Crucible stainless is so resistant to corrosion that even heavy industrial atmospheres leave it virtually untouched. Its high reflective qualities help keep temperatures comfortable during hot weather. Moreover, since stainless is so strong and tough, light-weight sections do a man-sized job – thereby saving you money both in metal and labor costs.

Of course, Crucible stainless steel is easy to work with – to bend, solder and weld . . . to form or machine. That's why it's used more and more wherever there's a need for a strong, hard, tough, corrosion-resisting metal. Let Crucible help you, too, decide which of the many grades of stainless will do your job best. For fast, helpful information – *call Crucible.*

CRUCIBLE first name in special purpose steels

54 years of Fine steelmaking **STAINLESS STEELS**

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This Week in Metalworking

STEEL
THE WEEKLY MAGAZINE OF METALWORKING

Vol. 135 No. 15 October 11, 1954

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Incidentally:

Special assistance from ACME Engineers is ever available to you. At no obligation, our chain experts will gladly cooperate with your designers on your projects.

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Dept. 10-N for new illustrated 76 page catalog on use and application of roller chains and sprockets.

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Vari-Speed Motor Pulleys

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Smaller Units! More HP!

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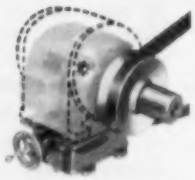


For New or Old NEMA Motors

CHECK ALL THESE NEW REEVES FEATURES!

1. New, smaller disc assemblies—engineered for new or old NEMA Motors.
2. New spiral-groove lubrication for rust-free, trouble-free service.
3. One-point lubrication when unit is stopped *or in operation.*
4. Superior base construction for greater rigidity and strength, reduced vibration and noise.

Write today for complete details. Specify S12-V545.

REEVES PULLEY COMPANY
COLUMBUS, INDIANA

behind the scenes

Batter Entitled to Squawk

Members of the AISE last week packed their soiled laundry and heavy equipment and fled from Cleveland two jumps ahead of the World Series inundation. STEEL's editors faithfully covered the Convention, distracted as they were by the Indians and the Giants, but it seems to us the industrial press takes its duties and responsibilities too seriously. For instance, there was no great mention of a quartet of ball-playing chickens that batted 850 in the Socony-Vacuum League.

If you attended the Convention you must have seen those chickens. The Socony-Vacuum people exhibited a sort of a Rube Goldberg pin-ball contraption, whereby a chicken snapped a bat by a rubber band, and set off a chain of reactions: the ball bounded past 6 infielders, struck a rail, which activated a light and released some chicken feed into a trough. If the ball wasn't hit properly, or failed to get past the fielders, the chicken took another time at bat. The theme of the exhibit was that "know-how" could be taught.

Well, we had never met a chicken that batted 850, so we asked R. J. Harty, Socony-Vacuum representative, for an introduction. Mr. Harty said there were four of them, a quartet of Plymouth Rocks from Little Rock. They were owned, trained and rented by Keller-Breland Associates, an Arkansas outfit that believes in being kind to animals. "Take care of thy chickens," paraphrased the K-B boys, "and thy chickens will take care of thee."

Mr. Harty explained that his company had exhibited the pull-hitting pullets at the Coal Show at Bluefield, W. Va., and at the Industrial Construction Exposition at Harrisburg, Pa. Nearly 200,000 watched the birds, including the Governor of Pennsylvania.

"These four chickens take turns in the batter's cage," said Mr. Harty. "Each one works an hour and a half. Why, during the course of an exhibition season, they out-draw most major league ball clubs. Each one is a star, but they never fight over salary: they're content to work for chicken-feed."

Watch Car Expense

On page 67 of this issue, Floyd Lawrence examines the problems that arise over the expense of business autos. Do you own a fleet? Do you operate only one or two cars? How do you handle your running costs? Writing from Detroit, where he sits with one hand on the national auto pulse, and the other on his typewriter, Editor Lawrence passes along his findings. Even if you don't operate a heap or a fleet for business purposes, you will find the article on business auto expense useful and instructive.

Razzle Dazzle Figuring

Facts and figures are always interesting—but to manufacturers and sales managers they are fascinating. So here's something to play with: there are approximately 55,000 plants in the metalworking industry. Now, if you were running a weekly magazine representing and informing that industry, where would you concentrate your circulation? In 30,356 plants (more than half the total) employing fewer than 20 persons—or in 24,644 plants (less than half the total) employing more than 20 persons?

No circulation manager or sales manager could view lightly more than half the metalworking plants in the country, could he? Well, here are the figures, so take it from here: more than one-half of the nation's metalworking plants employ fewer than 20 persons, and account for a mere 3 per cent of the industry's output! The remaining plants, less than half of the total, account for 97 per cent of all metalworking business. Now you may guess where STEEL concentrates its circulation to help advertisers reach the heart of the market!

Shrdlu

(Metalworking Outlook—Page 55)

Completely Automatic Installation in Major Appliance Plant

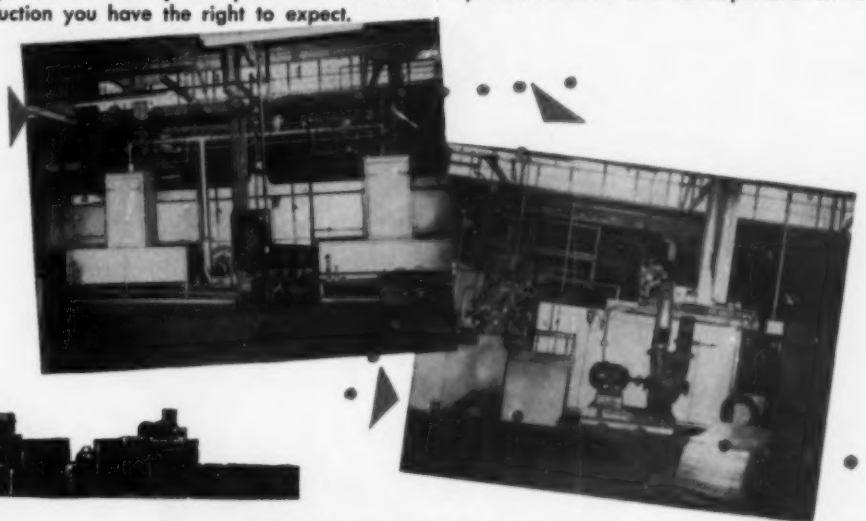
Special Power Spray Washer For Application of Dry Film Coats to Flat Sheets

Takes Mill Steel — Cleans It, Applies and Dries the Coating with Speeds Up to 400 Sheets per hour

Here is another example of P-D engineering efficiency. The Power Spray Washer, shown in this completely automatic installation in the plant of a major appliance manufacturer, meets and solves important production problems. A special washer such as this was required to not only **clean** mill steel but to **apply** and **dry** a Dry Film Coat for drawing, stamping, etc. High productivity requirements were met by P-D engineering this washer to handle the flat pieces at speeds up to 400 per hour. This Two Stage Washer and Forced-Dry Oven is heated by direct gas fired, vertically mounted heaters.

PETERS-DALTON is an organization of specialists—staffed by men who KNOW the answers to your problems. Power Spray Washers (like the one illustrated) of all sizes, types and required uses, can be developed to meet your needs by P-D. Regardless of size—from a single unit to a **complete** system—an installation by Peters-Dalton can be depended on to give you the service and production you have the right to expect.

The two photographs at the right are actually continuing views of a Two Stage Washing Machine with Blow-Off Section. Flat sheets enter this continuous unit for cleaning and coating and exit completely finished at high speeds to the right.



P-D—one of the world's largest manufacturers of Complete Finishing Systems—also builds . . .

- *Hydro-Whirl Paint Spray Booths*
- *Industrial Washing Equipment*
- *Drying and Baking Ovens*
- *Hydro-Whirl Dust Collecting Systems*

PD Peters-Dalton INC.

NEW POWER SPRAY WASHER BULLETIN

We have just published a new Technical Bulletin No. 301 on Power Spray Washers. It is completely informative, profusely illustrated, and contains engineering drawings of many types of Power Spray Washing Machines. We will gladly send you a copy if you will fill out and return this coupon.

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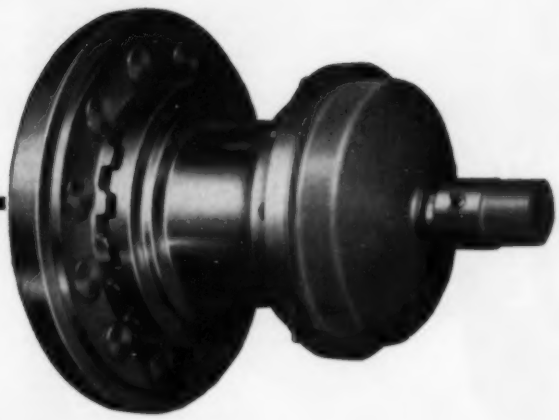

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- Can be single-stroked, jogged or run continuously.
- Operates effortlessly by palm buttons or foot switch.
- Stops automatically if power or air pressure fails — an important safety feature.

Never before in O. B. I. Press history, has there been so significant a development as this new Niagara line . . . Series AA. Built in eight sizes, with shaft diameters from 3 to 7½ inches, it has set a new high for performance and stamina in blanking, forming, drawing, perforating, combination die and automatic feeding operations.

Get the complete story. Send for literature. Talk with our representative. SEE the press in action. Compare! Then, decide.

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Forming the above Special Phillips Truss Head in two blows presented a difficult upsetting task. This was successfully accomplished when the manufacturer specified Keystone "Special Processed" Cold Heading Wire.

The uniform grain flow properties of "Special Processed" Wire provided the desired upsetting and die forming qualities necessary to form the thin head section without distortion or cracking. The structural soundness and uniformity of "Special Processed" Wire further proved itself by trouble-free machine operation, longer die life and a finished product of the highest quality.

Next time you have a difficult cold heading job, try "Special Processed" Wire. See your Keystone representative or write for more information.

Keystone Steel & Wire Company
Peoria 7, Illinois
Industrial Wire Specialists

LETTERS
TO THE EDITORS

Carried Away by Transportation

Recently you were kind enough to send me ten tear sheets of the article, "Transportation in Distribution," Number 7 in STEEL's 1954 Program for Management, which appeared on p. 89 of the Aug. 23 issue. Would you be kind enough to send me 60 more for distribution to our plants throughout the country.

Kenneth L. Vore
general traffic manager
Westinghouse Electric Corp.
Pittsburgh

. . . We were pleasantly surprised to see such a good coverage of our field in a nontraffic publication. Through efforts such as yours, management should become aware of the need and importance of an alert traffic manager . . .

R. W. Hagemann
president
Delta Nu Alpha
Transportation Fraternity Inc.
New York

How Detroit Shuts Down

Would it be possible to obtain tear sheets of the article, "When Detroit Stops 1954 Model Output, Here's How It's Done" (Sept. 6, p. 63). If tear sheets are available, we would like 25.

J. F. Doris
purchasing agent
Schlegel Mfg. Co.
Rochester, N. Y.

• *Sent.—ED.*

Aluminum Specs Clarified

We would appreciate receiving two additional copies of your article, "Aluminum Specs Are Standardized" (New system of uniform alloy designations will clear up confusion from special numbers . . .) which appears on p. 94 of the Aug. 9 issue.

T. Waldenberg
purchasing agent
Loral Electronics Corp.
New York

Please send me a copy of "Aluminum Specs Are Standardized" . . .

H. L. Myers
chief metallurgist
Power Tube Division
Raytheon Mfg. Co.
Waltham, Mass.

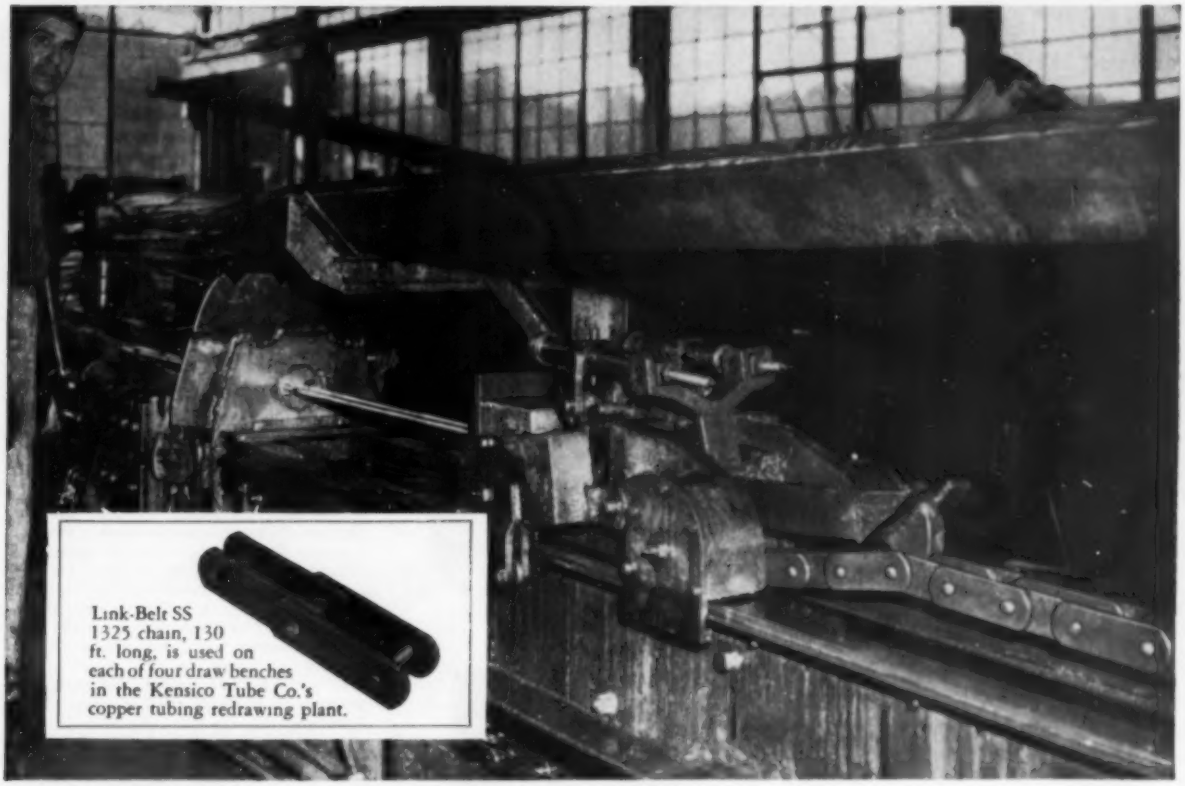
• *Sent.—ED.*

Get More for Selling Dollar

Please send me a copy of your article, "How To Reduce Selling Costs Without Scuttling Your Sales Program," (The average cost of industrial orders is $187.39; you can get more for that

(Please turn to page 12)

Here's why so many of the nation's draw benches use LINK-BELT chain



Link-Belt SS 1325 chain, 130 ft. long, is used on each of four draw benches in the Kensico Tube Co.'s copper tubing redrawing plant.

No ONE chain serves every purpose —get the RIGHT one from the complete line

Class H drag chain—for drag conveyors, handling shavings or other refuse in runways or troughs.

Class C combination chain—popular, durable, low cost design for elevators, conveyors.

LXS chain — particularly suitable for heavy-duty drive and conveying jobs.

Transfer chain with tilting dogs — for plate and slab travel, loads up to 300,000 pounds.

LINK-BELT offers the chain that's best for every job

WHETHER it's for a 5000 or a 100,000-pound bench, Link-Belt draw bench chain is built to maintain close pitch and correct sprocket contact. Links are accurately machined after hardening by a special process that assures longer chain life.

Manufacturing refinements such as these are typical of every chain in the complete Link-Belt line. Accurate control of raw materials and manufacturing processes is your assurance of uniformity.

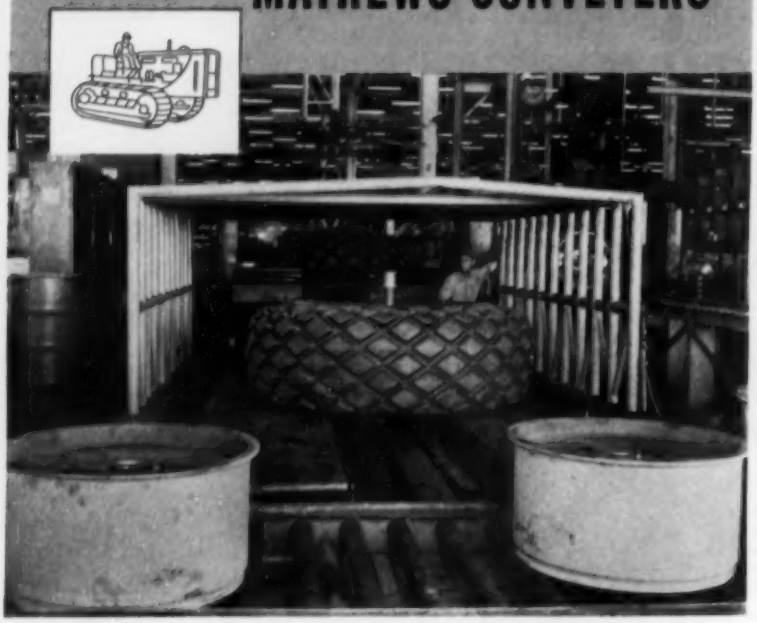
For complete information on chains and sprockets for draw bench or any drive or conveyor service, see your Link-Belt sales representative. He can show you the *one* chain that's best for your requirements.

LINK-BELT

CHAINS and SPROCKETS

LINK-BELT COMPANY: Executive Offices, 307 N. Michigan Ave., Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office: New York 7; Canada, Scarboro (Toronto 13); Australia, Sydney; South Africa, Springs. Representatives Throughout the World. 13.350

WHEREVER CATERPILLAR-BUILT PRODUCTS ARE MADE
YOU'LL FIND MATHEWS CONVEYERS



Wheel and tire assemblies are handled with Mathews Conveyers at Caterpillar Tractor Co.

Mathews Conveyer Company is glad to have an opportunity to salute the great Caterpillar organization, which is this year celebrating 50 consecutive years of continuous production of track-type tractors. The growth of that company has been a phenomenal one, and its product, the crawler tractor, is, in its 50th year, better and busier than ever before.

Mathews Conveyers were put to work by Caterpillar Tractor Co. nearly 30 years ago and today, as then, many of Caterpillar's world-famous products are handled with Mathews power and gravity conveyers and special conveying machinery.

We have slanted the August issue of our company publication, "What's New With Mathews," to Caterpillar progress. Copies of this are yours for the asking. Remember, too, that the service of your nearby Mathews engineer is available to you for the discussion of your handling problems.

MC
MATHEWS CONVEYERS
GENERAL OFFICES . . . . . *Mathews Conveyer Company*
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ENGINEERING OFFICES OR SALES AGENCIES IN PRINCIPAL AMERICAN AND CANADIAN CITIES

LETTERS

(Concluded from page 10)

money . . .). The article appeared on p. 65 of the Aug. 16 issue.

I loaned my copy to a customer who failed to return it to me.

Harold F. Miller
33 Mt. Pleasant Parkway
Livingston, N. J.

. . . your facility for expressing complex concepts in simple terms is one that I should like to acquire. Reading your article has given me a new slant on how to present a number of the ideas you discuss.

Charles W. Smith
McKinsey & Co.
New York

Diversification: Complex Story

I have just seen your story on p. 113 of the Sept. 13 issue, "Product Diversification: Five Roads to Greater Profit," Number 8 in STEEL's 1954 Program for Management (A new product is only one of the good cards in the management deck . . .). The many phases of this highly complex problem are well presented . . . we would like to distribute copies to our staff members currently engaged in industrial development projects in Asia and Latin America.

Paul B. W. Gollong
manager
International Division
Armour Research Foundation
Chicago

Platers Tell All

In the Aug. 2 issue on p. 100, there is an interesting article, "Platers Share Secrets" (Special baths for engineering plating are unveiled . . .). We are specifically interested in molds such as you refer to on p. 101 and would appreciate the names of companies making them.

Louis H. Morin
consulting engineer
Gries Reproducer Corp.
New Rochelle, N. Y.

• *Write to Harold Marcus, Electrochemical Industries Inc., Jacques Street, Worcester, Mass.—ED.*

Cast Iron for Nitriding

In the Aug. 9 issue an article, "Case Hardening Steel by Nitriding," on p. 96 mentions that cast irons of special analyses can be nitrided (A case having a hardness of 1000 Vickers-Brinell is produced on a special nitriding cast iron . . .). I would appreciate the references used in preparing this phase of the article.

W. J. Baker
plant purchasing agent
American Can Co.

• *Write to Dr. M. B. Bever or Dr. C. F. Floe, Massachusetts Institute of Technology, Cambridge, Mass.—ED.*

with ACME-GRIDLEY Bar Automatics

Whether you "automate" or pick 'em up with your fingers, you're going to have a certain amount of handling in making any product. But, the less *re*handling—the faster the job is done and the lower the cost per piece.

That is why more and more manufacturers are getting more operations on their primary machining equipment. It's also why, every day, more intricate parts like these—and larger ones, too—are being *completed in one setup* on multiple spindle Acme-Gridley bar machines.

Ingenious tooling of these versatile machines with standard National Acme toolholders and attachments often eliminates second operation work entirely—saves not only handling, but also extra machines, floor space and valuable man-hours. And in addition, the parts are more accurate because you don't have to re-chuck.

Check your machining methods today—then ask your engineers and ours to talk it over.

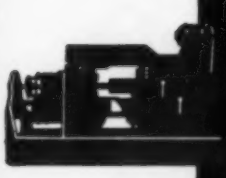
Remember—the biggest help to your competition is your continued use of obsolete equipment.

ON JOBS LIKE THESE

DRILLED STUD $\frac{3}{8}$" diameter, $2\frac{1}{4}$" long.
MATERIAL: B-1113 CD Steel.
OPERATIONS: 12 including rolled thread and spindle stopper for cross drilling to blind hole.
MACHINE TIME: 9 seconds (400 completed pieces per hour.)
(Formerly done in two setups)

WORM $\frac{3}{8}$" diameter, $1\frac{3}{4}$" long.
MATERIAL: B-1113 CD Steel.
OPERATIONS: 9 including machining the worm and broaching end of piece.
MACHINE TIME: 8 seconds (450 per hour.)
(Formerly done in three setups)

Ask for Catalog M-450



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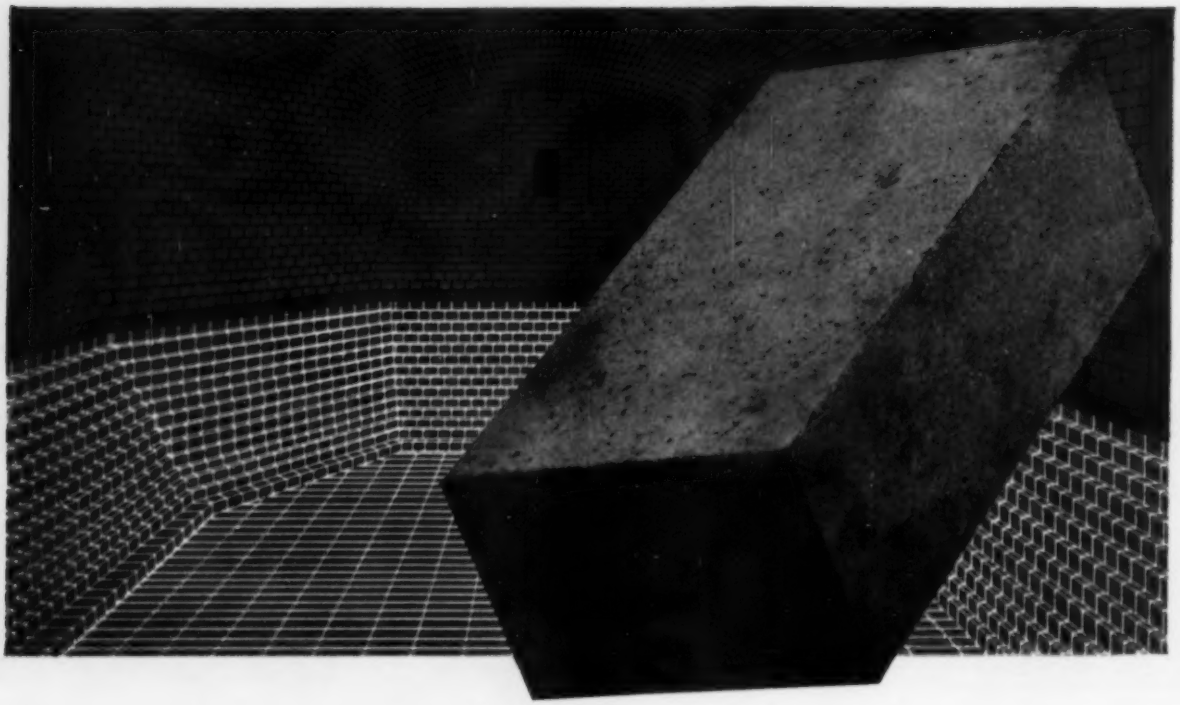

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High MgO—Contains more than 95% MgO (165 pounds of MgO per cubic foot of brick).

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Low calcium oxide—No refractory damage caused by slaking during a slow heat-up or while the furnace is idle. (Brick contains only 1.2% CaO).

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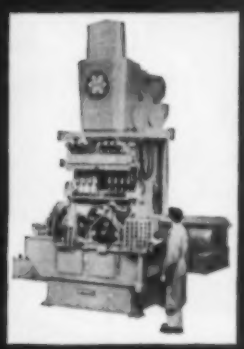
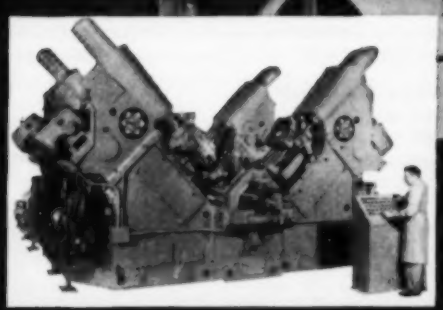
Specifications of this model are included in our general catalog—obtainable at the offices listed below.





This multiple-spindle, heavy-duty model is designed to fit any type of production line. Examples of its adaptability: above, two four-spindle machines with tip-up fixtures; left, V-type; upper right, eight spindle vertical.

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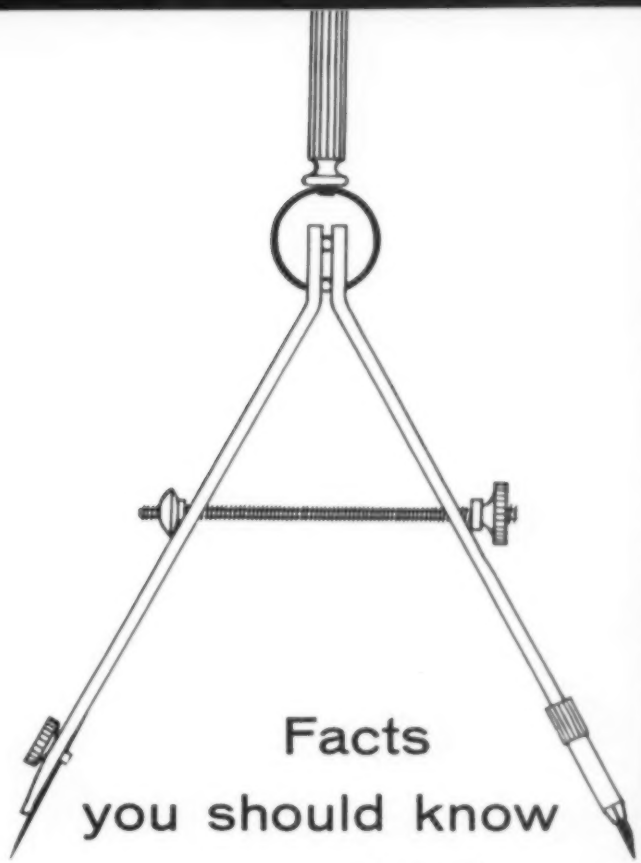


Facts you should know about Alcoa Aluminum extruded shapes

BIG EXTRUSION NEWS FOR 1954—ALCOA'S GIANT 14,000-TON PRESS MAKES POSSIBLE LARGER, THINNER, MORE INTRICATE SHAPES

Annual production of aluminum extrusions between 1949 and 1953 increased from 150 million pounds to nearly 400 million pounds. A look at the "business end" of any one of Alcoa's fifty extrusion presses quickly shows why. A multitude of complex shapes, once requiring time-consuming assemblies, now ribbons onto the runout table in minutes. Fabrication and assembly time are reduced, product efficiency is increased and over-all costs are lowered.

Aluminum extruded shapes are used by all of industry. Biggest user last year, the building industry, consumed extruded shapes at the rate of more than 11 million pounds each month. Behind, but a close second, came the aircraft builders who, in order to increase range, speed and payload, specified between 10 million and 11 million pounds monthly. Next came truck, bus and trailer builders, who for the year built 45 million pounds of aluminum extrusions into their vehicles. Millions of pounds went into thousands of different articles varying all the way from portable outdoor clothes driers to rowboats.

But by far the biggest news in aluminum extrusions today is the installation and operation of the giant 14,000-ton press and its collateral facilities at Alcoa's Lafayette, Indiana, Works. This press, on lease from the Air Force as part of its heavy press program, offers design possibilities never available before. Until now, the largest extruded shape was one whose cross section could be encompassed in a 13-inch circle. On the new press, the practical maximum is a circumscribing circle 23 inches in diameter.

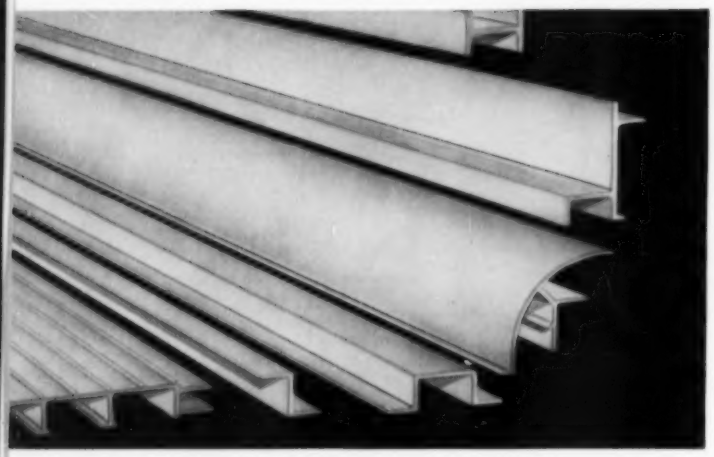
In addition to capacity for large extrusions, Alcoa has capacity for large numbers of extrusions. A total of fifty presses, the country's largest light metal extrusion facility, is readily available to you. Shapes "tailor-made" to your individual requirements can be delivered quickly and in production lots. Die charges for these "tailor-made" shapes are relatively low.

Giant, new 14,000-ton press now operating at Alcoa's Lafayette, Indiana, Works. On lease from the Air Force under its heavy-press program, this press is capable of producing far more complex, longer, wider and thinner shapes than ever before possible.

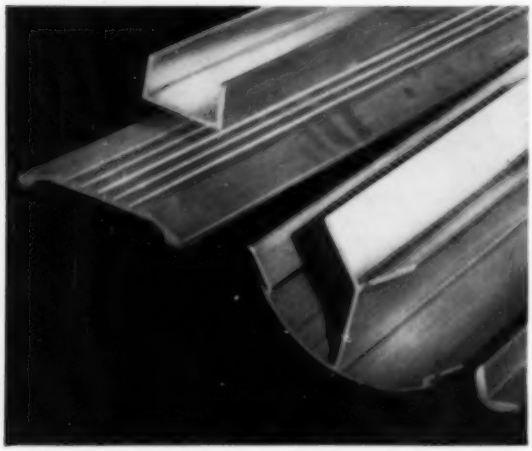
Who uses Alcoa Aluminum extruded shapes?

Almost every manufacturer has a product or part of a product which might be made more economically by extrusion. By putting the metal exactly where it's needed, by eliminating bits-and-pieces fabrication, extrusions represent an ideal solution to cost-conscious designers. Extrusions free the designer's imagination. Nearly everything he sketches can be expressed in metal by the extrusion process.

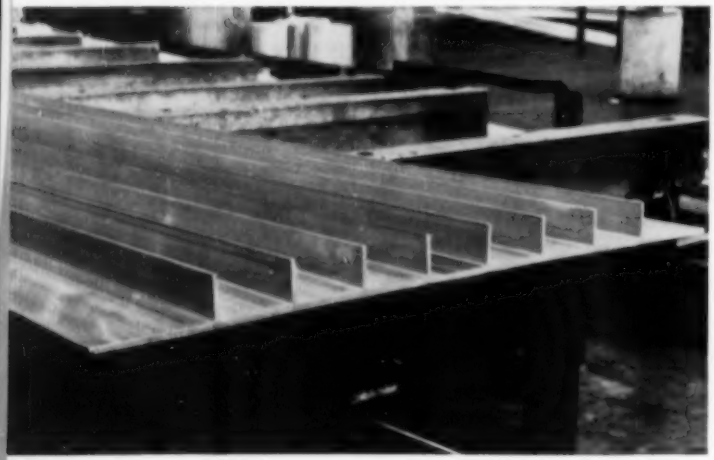
Almost anywhere you turn—at home, riding to work, flying, or in the office—you can see Alcoa® Aluminum Extruded Shapes at work . . . for you. They are there because they represented the best-known way in which certain shapes could be produced in the least time—at the least expense.



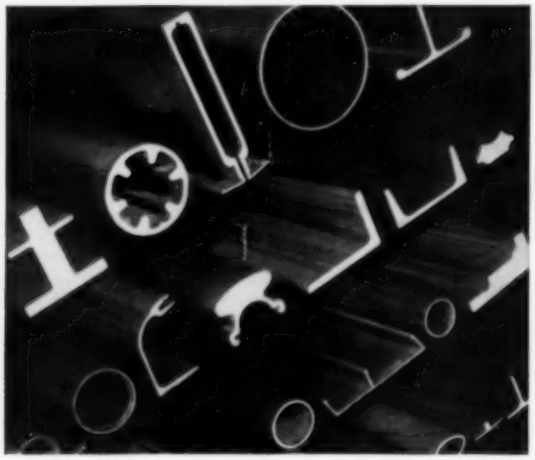
Truck body, bus and trailer builders are using more and more aluminum extruded shapes each year. Here are typical examples of shapes used for side sills, cross members, flooring, rub rails, roof bows and corner posts.



Millions of feet of aluminum extruded shapes are used every year for architectural and structural applications such as doors, windows, railings, beams, cornices and trim. Use of these shapes results in cheaper, better construction.



Aircraft designers specify aluminum extruded shapes as spars, spar caps, flooring, interior trim and, often, exterior skin sections. Exterior skin shown here is first extruded as a "V," then flattened. Strengthening rib members thus become an integral part of the outside skin.



Extrusion can be used most effectively to produce complex shapes having compound curves or undercuts. Thick and thin sections are easily joined. In short, the process provides the most efficient distribution of metal, and places that metal exactly where it is needed.

Design tips

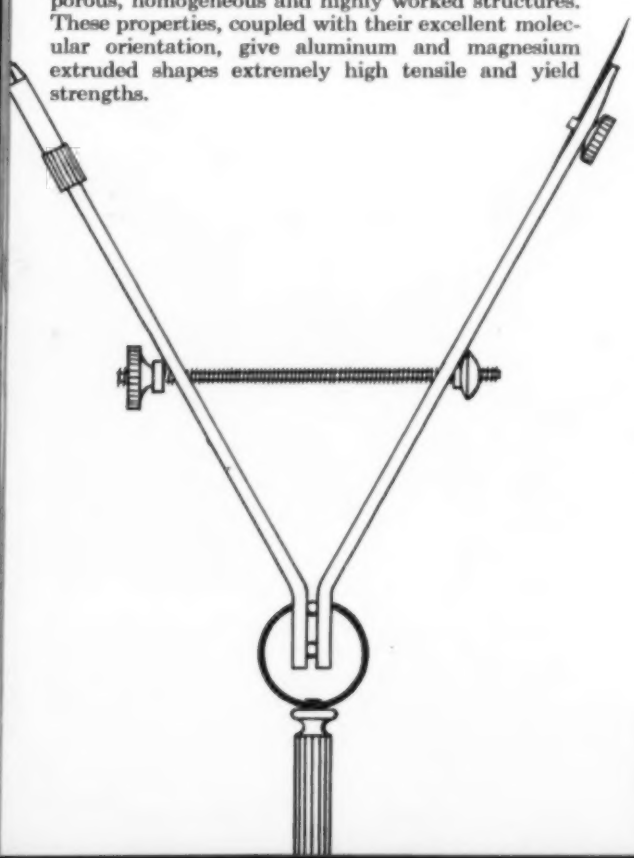
Perhaps most versatile of all the fabricating processes, extrusion permits you to reproduce in metal practically any shape you can draw—simple or complex, balanced or unbalanced, solid or hollow. Remember, however, that costs generally increase as you go from solid to semihollow to hollow.

Semihollow sections with unbalanced die tongues cause production problems. Stay away from these and extreme thickness variations or hollow shapes having unsymmetrical voids with inadequate thicknesses between voids.

Alcoa's 14,000-ton press affects fundamental design rules only in that it permits production of more intricate, wider, thinner and longer shapes.

Mechanical Properties

During extrusion, the metal is thoroughly kneaded. As a result, aluminum extruded shapes are nonporous, homogeneous and highly worked structures. These properties, coupled with their excellent molecular orientation, give aluminum and magnesium extruded shapes extremely high tensile and yield strengths.



Aluminum and Magnesium Alloy Selection

Softer alloys are generally the least costly to extrude. To keep costs down, select the softest alloy that provides the physical and mechanical properties your products require.

Most commonly extruded aluminum alloy is the heat-treatable 6063*. In the T6 temper it develops 30,000 psi yield strength, 35,000 psi tensile strength. For higher strengths, alloys* 2014, 2024 and 7075 are used.

Most widely extruded magnesium alloy is AM52S. Highest strength and elongation are achieved with AMA76S. AM3S, AM52S and AMC57S are all readily weldable by the inert gas shielded-arc method.

*Alloy Designations

New	Old	New	Old
2014	14S	6063	63S
2024	24S	7075	75S

Costs

Extrusion die costs are low, varying from $120 up. Dies for many standard shapes are kept on hand for your use at no added cost to you. Larger dies, and especially those for the 14,000-ton press, are more expensive. But because of subsequent savings in man-hours and assembly time, finished piece costs are invariably lower than for any alternate process. Moreover, the use of a standard series of die adapters often keeps tooling costs to a minimum.

Thickness

Relationship of thickness to width in extruded shapes is governed by a thickness ratio that varies with the alloy. For example, 6063 parts 8 inches wide should be no thinner than .125 inch. Over-all thickness for parts made on the smaller presses ranges from about .040 inch up to several inches with less than .040 inch produced occasionally. Typical thickness-width ratio for parts extruded from 7075-T6 alloy on the 14,000-ton press is .375 inch thick, 23 inches wide—or .156 inch thick and 34 inches wide for panel-type shapes extruded in a "V" and subsequently flattened. This is especially significant considering 7075 alloy in the T6 temper is one of the strongest of all the extrudable, heat-treatable alloys. And even this ratio is not considered to be the ultimate!

Tolerances

Extrusion, though not a precision process, can produce shapes to reasonably close tolerances. Because shapes of intricate configuration can be produced, tolerances must be measured several ways: straightness, flatness, twist, section thickness, angles and contours, and corner and fillet radii. Though it is possible to hold closer than standard tolerances in some instances, lowest cost can be maintained by specifying Alcoa standard extrusion tolerances wherever possible.

The future of Alcoa Aluminum extruded shapes

After working with extrusions for over fifty years with a total of five extrusion plants now in operation, Alcoa engineers have learned much about the extrusion process and the application of extruded shapes in cost reduction. For example, stepped shapes. Such parts as aircraft spar caps require substantially less machining. The higher pressures now available mean even better metal flow and improved molecular orientation resulting in stronger step joints.

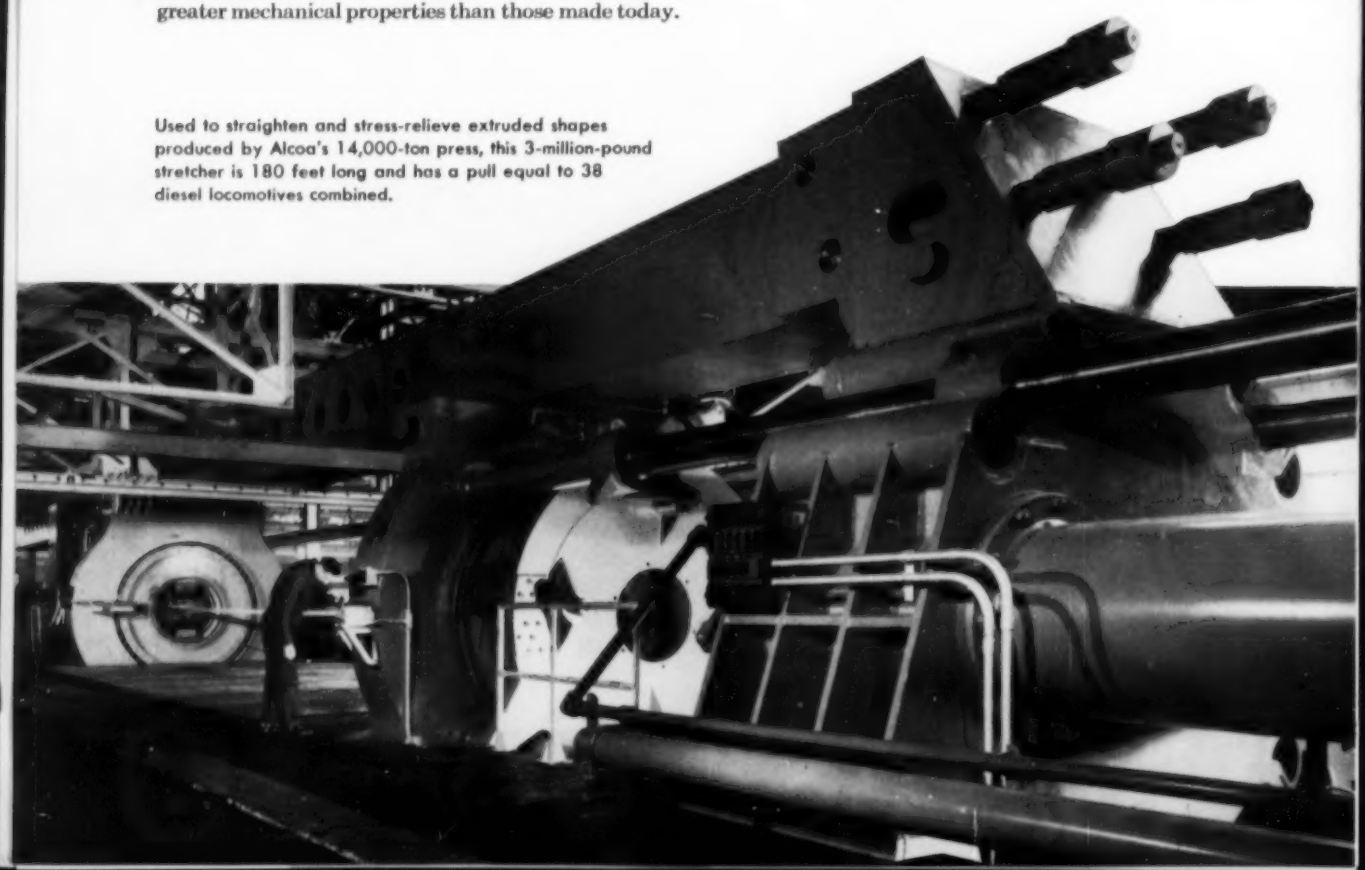
Development work is well under way on tapered wall extrusions as well. A rarity today, they may well be commonplace tomorrow. Here, as with stepped extrusions, parts will be more complete as they come from the press and the machining, now sometimes necessary, may be significantly reduced or eliminated entirely.

Extruded shapes fall into three general categories: those ready for use after being cut to length; those requiring simple machining before use; those cut into blanks for subsequent forging. Certainly higher grade forging stock will now be produced. Moreover, techniques are being perfected which will permit effective combination of the forging and extrusion processes to produce shapes far more complex and possessing far greater mechanical properties than those made today.

Your next step

Write ALUMINUM COMPANY OF AMERICA, 1994-K Alcoa Building, Pittsburgh 19, Pa., for your free copy of our book, *Alcoa Aluminum Extruded Shapes*. Use your company letterhead and be sure to let us know your job function.

Or, if you have some specific design problem now, contact your local Alcoa sales engineer. Don't hesitate to use his time and talents freely, even if you are not planning to use extruded shapes next week, next month or next year. You can locate his office by looking under "Aluminum" in the classified section of your telephone directory.



Used to straighten and stress-relieve extruded shapes produced by Alcoa's 14,000-ton press, this 3-million-pound stretcher is 180 feet long and has a pull equal to 38 diesel locomotives combined.

* Buy Victor and get Torch Versatility

Cutting with VICTOR Model 300 Series Torch Butt and Model 2450 Cutting Attachment, cuts to approximately 8".

The versatility of VICTOR torches means you can buy exactly what you need for today's job, then add other nozzles, tips and attachments as required. Your equipment grows with your needs; stays custom-fit to your work. For example, here are a few of the 34 standard attachments for VICTOR 300 Series Torch Butts.

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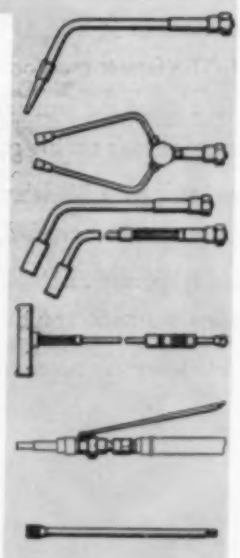

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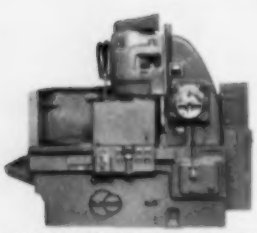
"For example, one of my customers had been grinding 1/8" of stock off both sides of 3" x 4" 4140 steel blocks, to a dimension tolerance of ± .0005". The fastest method in his shop involved turning the blocks in a chucking lathe and then grinding them in three operations on his grinder.

"We put the blocks, 17 per load, on a Blanchard and ground them to size . . . ***in exactly the same time that my customer needed to turn 5 blocks before grinding.***

"If you could tell every machine shop owner that story, you'd sell more grinders than you could build."

We're following his suggestion!



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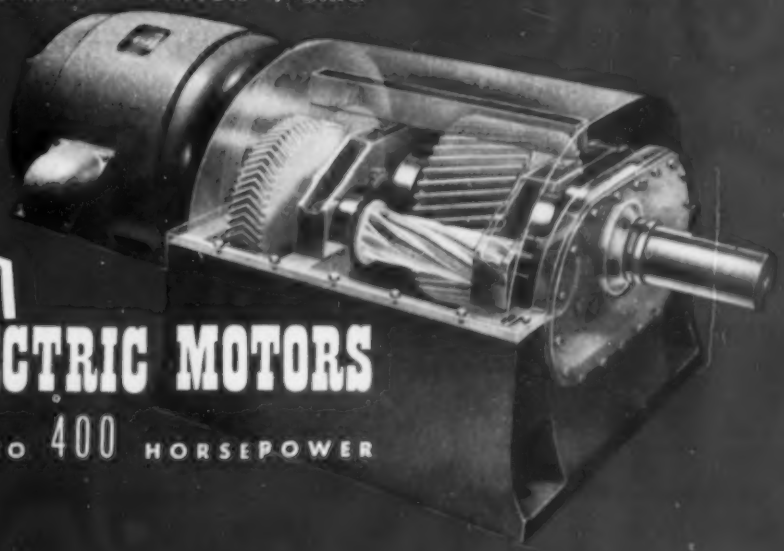
Use the RIGHT power drive to increase saleability of your motor driven products . . . improve the economy, safety, and productivity of your plant equipment. That's the horsesense way to use horsepower.

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO



MASTER

ELECTRIC MOTORS

1/8 TO 400 HORSEPOWER

FREE-MACHINING ENDURO STAINLESS STEEL BARS

Put parts in the pan 90% as fast as Bessemer screw stock

You can give duplicate parts the high physical and chemical properties of stainless steel. And, you can do it without a heavy production penalty!

Simply set up and run Free-Machining ENDURO Stainless Steel Bars. They'll respond beautifully at every station on your automatics. Two grades are fully 90% as machinable as Bessemer screw stock.

These high-quality bars are cold-finished by Republic's Union Drawn Steel Division. They provide close tolerance, accuracy of section, uniform soundness, and fine surface finish.

Free-Machining ENDURO also is available in hot-rolled bars and in wire. Republic metallurgists and machining advisers are ready to help you apply ENDURO every step of the way. Just write:

REPUBLIC STEEL CORPORATION
Alloy Steel Division • *Massillon, Ohio*
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, N. Y.

NEW! 96-page pocket size booklet, "How To Machine Republic ENDURO Stainless Steel Bars." Packed with machining tips, tables of feeds and speeds, stainless steel properties, other vital information. Write Republic. Ask for ADV-607. FREE!

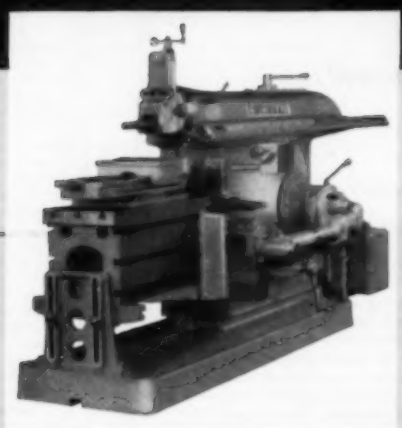
REPUBLIC ENDURO FREE-MACHINING STAINLESS STEEL

REPUBLIC STEEL

Other Republic Products include Carbon and Stainless Steels—Sheets, Strip, Bars, Wire, Pig Iron, Steel and Plastic Pipe, Bolts and Nuts, Tubing

extra clamping surface here for the bulky casting!

Photo courtesy of Marion Machine Foundry & Supply Company.



Cincinnati Shapers with large area Cincinnati Supplementary Table Tops allow firm clamping of heavy bulky castings. These tables are a profitable accessory.

Set-up time is reduced, and more accurate cutting results from the firm clamping. It widens the use of a Cincinnati Shaper and is easily attached.

The versatility of a Cincinnati Shaper, "The handy man of industry", makes it a busy profitable tool in the shop.

Write for complete Catalog N-6.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI

P&H OVERHEAD CRANES

This P&H Crane is one of 14 with Magnetorque control serving the Ford stamping plant in Buffalo, New York. A total 222 P&H Overhead Cranes serve the Ford Motor Company in all its plants.

At FORD . . as everywhere . . .

P&H *Magnetorque*® *(crane control)*

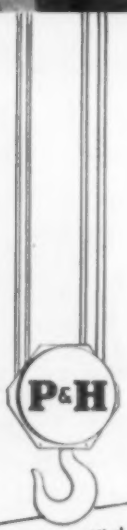
has proved itself!

Wherever you see these words, "Magnetorque Control" they stand for the finest in overhead crane performance. And, that means *proved* performance! . . . Proved in over 900 installations!

Developed and perfected by P&H, Magnetorque control has brought many outstanding advantages to crane users. First, it provides the finest speed regulation under all load conditions — with the convenience and economy of AC power — without harmful high motor currents. Second, it eliminates the mechanical load brake with all its costly service and replacement worries. Third, it assures more faithful, uninterrupted service — for many years to come.

Like all other P&H crane electrical equipment, Magnetorque control *is built by P&H* — specifically for crane service — *not adapted for it*. That is one of the reasons why P&H cranes deliver coordinated performance in all functions. It also explains why P&H delivers the most complete crane service in the industry.

Many leading American companies depend upon P&H for everything in connection with overhead cranes. You, too, will find that it pays!



A new fact-filled bulletin about P&H Magnetorque AC crane control is yours for the asking. Write for Bulletin C39-1.

P&H OVERHEAD CRANE DIVISION

HARNISCHFEGER CORPORATION

MILWAUKEE 46, WISCONSIN

the P&H Line

CALENDAR
OF MEETINGS

October 11-13, American Management Association: Fall manufacturing conference, Plaza hotel, New York. Association address: 330 W. 42nd St., New York 36. Vice president-secretary: James O. Rice.

October 11-15, American Institute of Electrical Engineers: Fall general meeting, Morrison hotel, Chicago. Institute address: 33 W. 39th St., New York 18. Secretary: N. B. Hibshman.

October 12-13, The Society of the Plastics Industry Inc.: New England section meeting, Mt. Washington hotel, Bretton Woods, N. H. Society address: 67 W. 44th St., New York 36. Executive vice president: Wm. T. Cruse.

October 12-14, American Gas Association: Annual meeting, Municipal Auditorium, Atlantic City, N. J. Association address: 420 Lexington Ave., New York 17. Secretary: Kurwin R. Boyes.

October 12-15, American Chemical Society, Chicago Section: National chemical exposition, Coliseum, Chicago. Society address: 86 E. Randolph St., Chicago 1. Manager: James J. Doheny.

October 13-15, National Industrial Conference Board Inc.: Atomic energy conference, Hotel Commodore, New York. Board address: 247 Park Ave., New York 17. Secretary: Herbert S. Briggs.

October 14, American Iron & Steel Institute: Regional closed technical meeting, Hotel William Penn, Pittsburgh. Institute address: 350 Fifth Ave., New York 1, Secretary: George S. Rose.

October 14-16, Foundry Equipment Manufacturers Association Inc.: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: Engineers Bldg., Cleveland 14. Executive secretary: Arthur J. Tuscany Jr.

October 16-19, Conveyor Equipment Manufacturers Association: Annual meeting, The Greenbrier, White Sulphur Springs, W. Va. Association address: 1 Thomas Circle, Washington 5. Executive vice president: R. C. Sollenberger.

October 18-19, Annual Boston Conference on Distribution: Hotel Statler, Boston. Information: Daniel Bloomfield, director, 80 Federal St., Boston 10.

October 18-19, American Society of Mechanical Engineers and American Society of Lubrication Engineers: Joint national lubrication conference, Hotel Lord Baltimore, Baltimore. Information: ASME, 84 E. Randolph St., Chicago 1.

October 18-20, Society of Automotive Engineers Inc.: National transportation meeting, Sheraton-Plaza hotel, Boston. Society address: 29 W. 39th St., New York 18. Secretary and general manager: John A. C. Warner.

October 18-22, American Society of Civil Engineers: Annual meeting, Statler hotel, New York. Society address: 33 W. 39th St., New York. Secretary: Col. Wm. N. Carey.

October 19, American Society of Safety Engineers: Annual meeting, Conrad Hilton hotel, Chicago. Society address: 425 N. Michigan Ave., Chicago 11. Secretary and managing director: Jasper J. Johnson.

October 19-20, American Machine Tool Distributors' Association: Annual meeting, Sheraton-Gibson hotel, Cincinnati. Association address: 1900 Arch St., Philadelphia 3. Executive secretary: Thos. A. Fernley Jr.

October 20, American Iron & Steel Institute: Regional closed technical meeting, Hotel Thomas Jefferson, Birmingham. Institute address: 350 Fifth Ave., New York 1. Secretary: George S. Rose.

October 20, Material Handling Institute Inc.: Top management conference, Drake hotel, Chicago. Institute address: 813 Clark Bldg., Pittsburgh 22. Managing director: R. Kennedy Hanson.

October 20-21 Steel Shipping Container Institute Inc.: Fall meeting, Pierre and Hampshire House, New York. Institute address: 600 Fifth Ave., New York 20. Secretary: L. B. Miller.

LEBANON STEEL Castings
are at work

WORLD WAR II proved that pipelines are lifelines that protect every man, woman and child in this country. Counting the billions of barrels of oil that flow through these lines is the job of huge meters—meters like Rockwell Manufacturing Company's type 5PH Rotocycles. And in many of these Rotocycle meters Lebanon CIRCLE L steel castings are used for the body base and covers.

Accounting for pipeline throughput is a tough, rigorous service for meters, involving such factors as high pressures (up to 1000 p.s.i.), pulsations, sudden surges and stresses induced by the pumps that keep the oil flowing.

Not all Lebanon castings actually protect life but *every* Lebanon engineered component works without fail because it is a product of men who give to their job the knowledge, interest and care of true craftsmen.

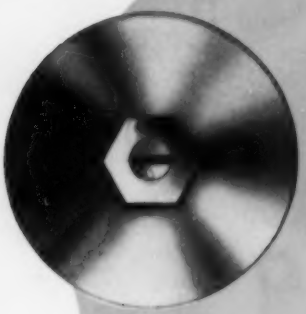
● See—STEEL WITH A THOUSAND QUALITIES—37-min., 16mm, semi-technical, full-color, sound film on the making of steel castings. For information write: Dept. B, Lebanon Steel Foundry.

LEBANON Castings
CARBON, LOW ALLOY
AND STAINLESS STEEL

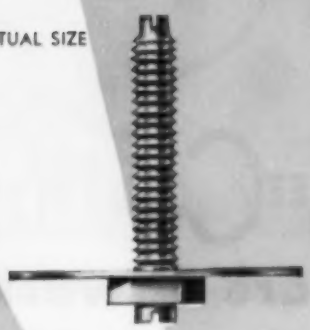
LEBANON STEEL FOUNDRY LEBANON, PA.

WITH CAMCAR COLD-FLOW

BIG HEADS CURE BIG HEADACHES



TWICE ACTUAL SIZE



Camcar Cold-Flow creates parts with hefty heads and slender shanks . . . *forms them in one piece* . . . eliminates the headaches of assemblies.

And Cold-Flow eliminates another headache — cost — by reducing metal waste . . . forms "big-headed" parts from small diameter wire rather than cutting them from large diameter bars.

From head to thread, Cold-Flow forms stronger parts. Metal grain smoothly follows the most intricate profile . . . is compressed at the surface for greater hardness and higher finish.

Cold-Flow makes miracles in large or small parts . . . in most all metals . . . and in volume.

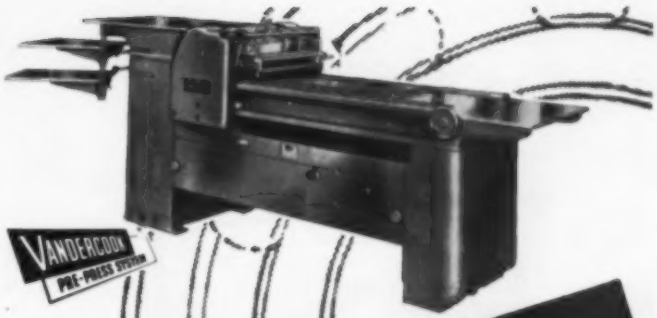
Send us specs and samples. Or ask for a field specialist.

TWICE ACTUAL SIZE

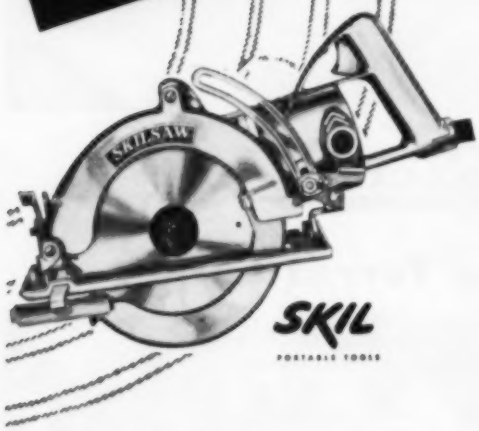
CAMCAR COLD-FLOW

CAMCAR SCREW & MFG. CORP.
ROCKFORD, ILLINOIS
Telephone: 5-9451 • Teletype: RK-8653

Color printing demands exacting precision, vibration-free press performance for accurate register of one color to the next. You'll find Federal Bearings here, too.



in the workshop . . . or the print shop



High operating speeds . . . heavy, suddenly applied radial and thrust loads . . . little maintenance or none at all—they're all part of the service conditions Federal Ball Bearings meet in power hand tools.

so much of industry *turns* on FEDERAL ball bearings

In hobbyists' tools and home appliances—in pressrooms and mass-production plants—in farm equipment and business machines—you'll find Federal Ball Bearings quietly and efficiently at work, in some of the hundreds of types and 12,000 sizes that the company has been producing for almost 50 years devoted *only* to making ball bearings.

When Federal Ball Bearings are a part of so many things you *use*, shouldn't they be a part of the things you make?

THE FEDERAL BEARINGS CO., INC. • POUGHKEEPSIE, N. Y.

256 fact-packed pages of information on ball bearings are yours for the asking in Federal's Catalog. Just drop us a line for your copy.

Federal BALL BEARINGS

One of America's Largest Ball Bearing Manufacturers

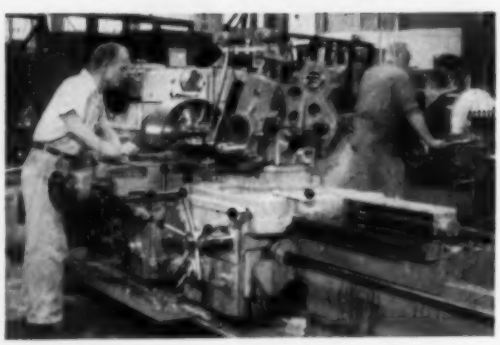
Precision Parts for Piasecki

by GISHOLT Saddle Type Turret Lathes

The latest thing in helicopters is the tandem transport—a remarkable development for vertical, forward and even reverse flying. Piasecki is a leader in this field, volume producing for the armed forces and commercial services.

Speed and accuracy are musts. And, here's why on this job (as on yours) Gisholt delivers both. You get more production because you can pour on all the power and speed the work and tools will take. The great strength and rigidity of Gisholt design assure lasting smoothness and accuracy.

ALL THE FACTS on Gisholt Saddle Type Turret Lathes, in five sizes, are yours for the asking, write today.



2L Saddle Type Turret Lathe does simultaneous boring and turning on heavy transmission bushing for Piasecki Helicopters.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

THE GISHOLT ROUND TABLE—*represents the collective experience of specialists in machining, surface-finishing, and balancing of round and partly round parts. Your problems are welcomed here.*

TURRET LATHES · AUTOMATIC LATHES · SUPERFINISHERS · BALANCERS · SPECIAL MACHINES

Heavy Duty Design

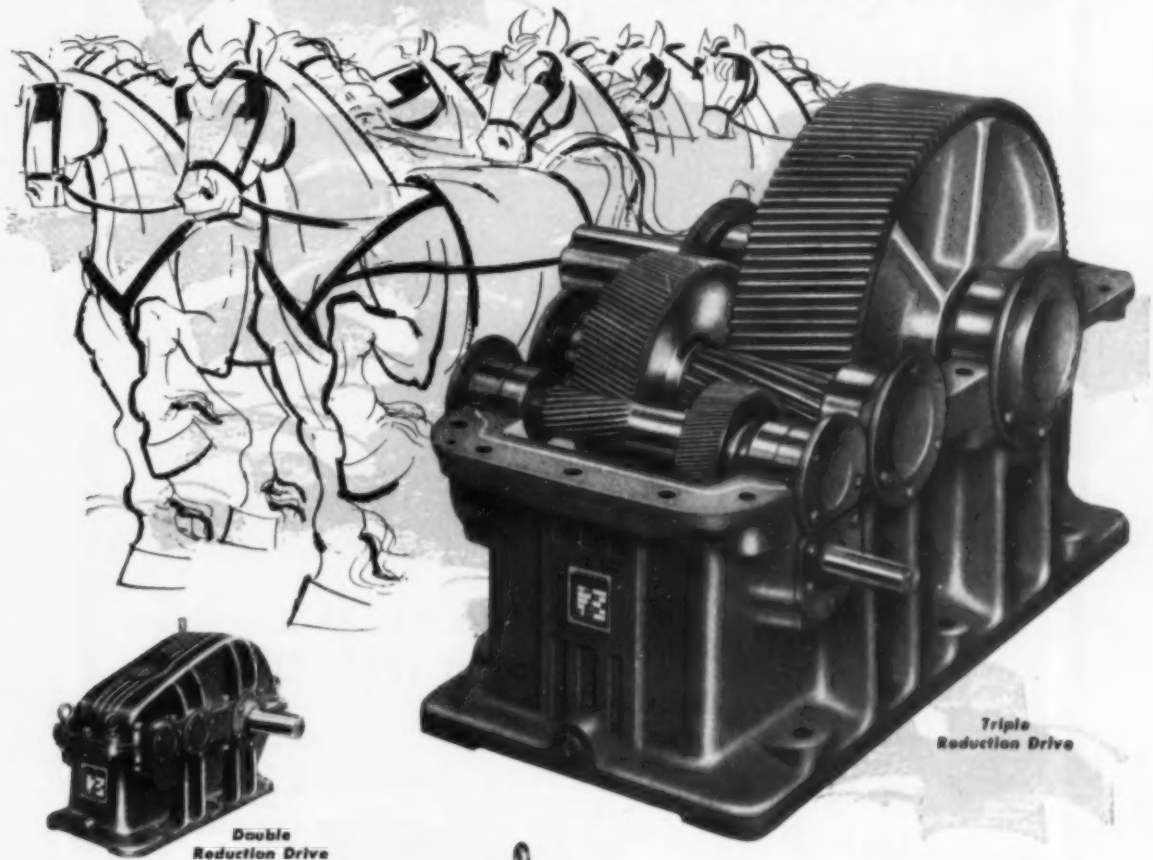
WITH MAXIMUM LOAD CARRYING CAPACITY

FOOTE BROS. MAXI-POWER DRIVES

Heavy Duty describes these tough, dependable drives perfectly! For these are the famous, job-proved units that were actually designed for only the hardest, most demanding daily service. Maxi-Power's precision generated helical gearing has been designed into the most *compact* housing possible to assure maximum load-carrying capacity in minimum space. Sturdy—reliable—with stamina to handle high horsepower—Maxi-Power Drives provide years of continuous service with minimum maintenance.

Foote Bros. Maxi-Power Drives are available with single, double or triple reductions, with ratios up to 360 to 1, capacities up to 1550 h.p. Remember, if you want heavy duty performance, you *need* Maxi-Power . . . there's nothing finer anywhere!

. . . learn how Foote Bros. Enclosed Gear Drives can meet your needs for toughest daily service. Write today!



Triple Reduction Drive

Double Reduction Drive

Line-O-Power Drive
Incorporate higher capacity, space saving, longer life Duti-Rated Lifetime Gears. Available in double and triple reductions with ratios from 5 to 1, up to 238 to 1; capacity range from 1 up to 200 h.p.

FOOTE BROS.

Better Power Transmission Through Better Gears

Manufacturers of Duti-Rated Lifetime Gears, enclosed gear drives of all kinds, gearmotors, aircraft-quality gears and actuators, and special machinery . . . the world's finest since 1859.

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DEDICATED
TO SERVING YOU
with a
Growing Line of
Quality Ferro-Alloys
FERRO-SILICON 25-50-65-75-85-90%
SPECIAL BLOCKING 50% FERRO-SILICON
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LOW CARBON FERROCHROME SILICON
HIGH CARBON FERROCHROME
LOW CARBON FERROCHROME
SILICO-MANGANESE
FERRO-MANGANESE
MEDIUM CARBON FERRO-MANGANESE
BOROSIL • SIMANAL • RARE EARTH ALLOYS
Briquets
SILICON • MANGANESE
SILICO-MANGANESE
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Ohio Ferro-Alloys Corporation
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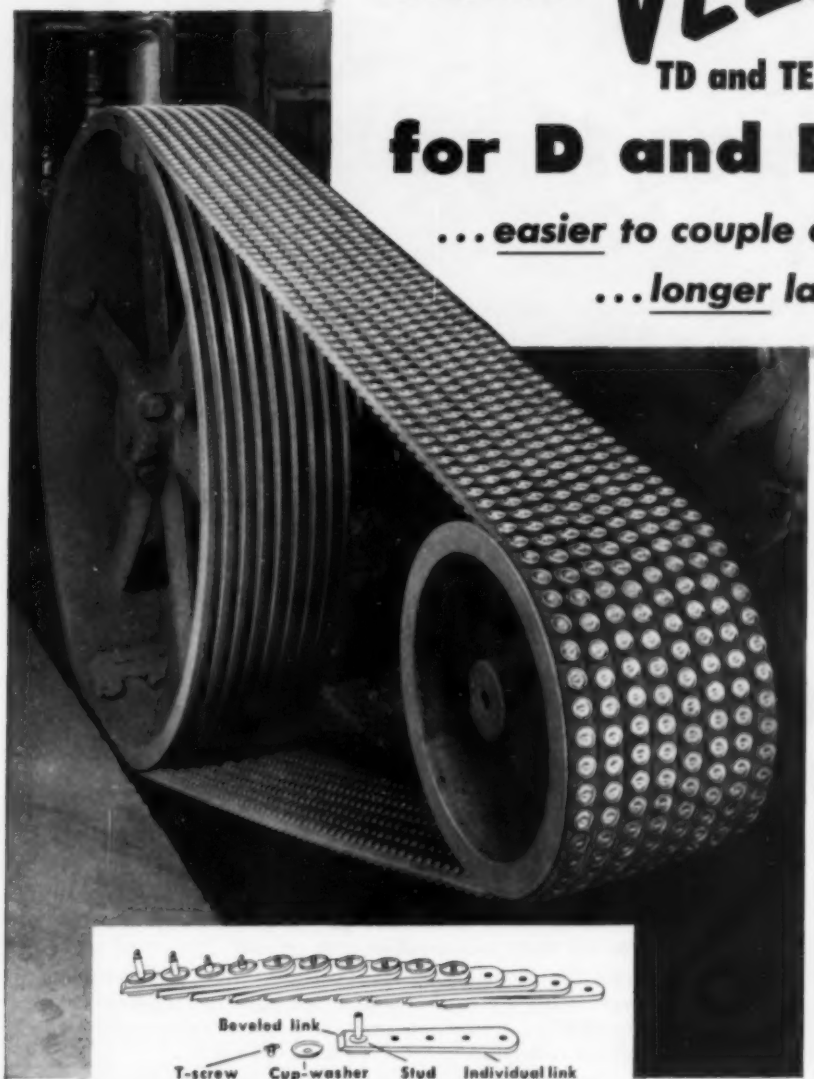
NEW VEELOS

TD and TE Adjustable V-belts

for D and E Drives

...easier to couple and uncouple

...longer lasting



This detailed line drawing of the new Veelos TD and TE v-belt makes it easy to see how this new v-belt is designed to do a better job... easier!

Now get the v-belt that's been especially developed for D and E drives—the new, patented Veelos TD and TE adjustable v-belt!

This new Veelos has advantages unmatched by any other v-belt. It is *installed quickly* without removing the outboard bearings found on most D and E drives. It is the easiest v-belt to couple and uncouple ever developed. Cup-washers and T-screws join links together to form individual belts of any length. Veelos TD and TE *lasts longer* because new high-tensile strength links plus the new stud, cup-washer and T-screw design give *added strength* —combines this added strength with *maximum flexibility* for cooler, smoother running.

Install this new Veelos TD and TE v-belt on your D and E drives. Prove to yourself why there's no v-belt that can match the performance, the efficiency and the economy of Veelos TD and TE.

Get the complete story of this great new v-belt for D and E drives. Send the coupon now for new 8-page illustrated catalog.

VEELOS
THE LINK
V-BELT

Veelos is known as Veelink outside the United States.

MANHEIM MANUFACTURING & BELTING CO.
613 Manbel St., Manheim, Pa.

Please send copy of your new Veelos TD and TE v-belt catalog.

Name .....

Company .....

Address .....

.....

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

IMPACT!

U. S. Patent 2184926 (others pending)

Why is Malleabrasive packed with power? Because it keeps its *punch* longer . . . retains its original grain size longer! After ordinary abrasives have shattered into "fines" and passed into the dust collector, Malleabrasive *still* stays young—alive with power!

Malleabrasive has all the toughness of malleable iron PLUS peculiar hardness characteristics provided only by our patented Malleabrasive process. This amazing combination results in fast cleaning combined with tremendous reduction in wear on machine parts.

That's why foundrymen agree that Malleabrasive is the iron fist for cleaning, but the velvet glove for machine parts wear. No "fines" here to chew machine parts to bits! Malleabrasive *wears* down . . . never shatters . . . continues punching to the end!

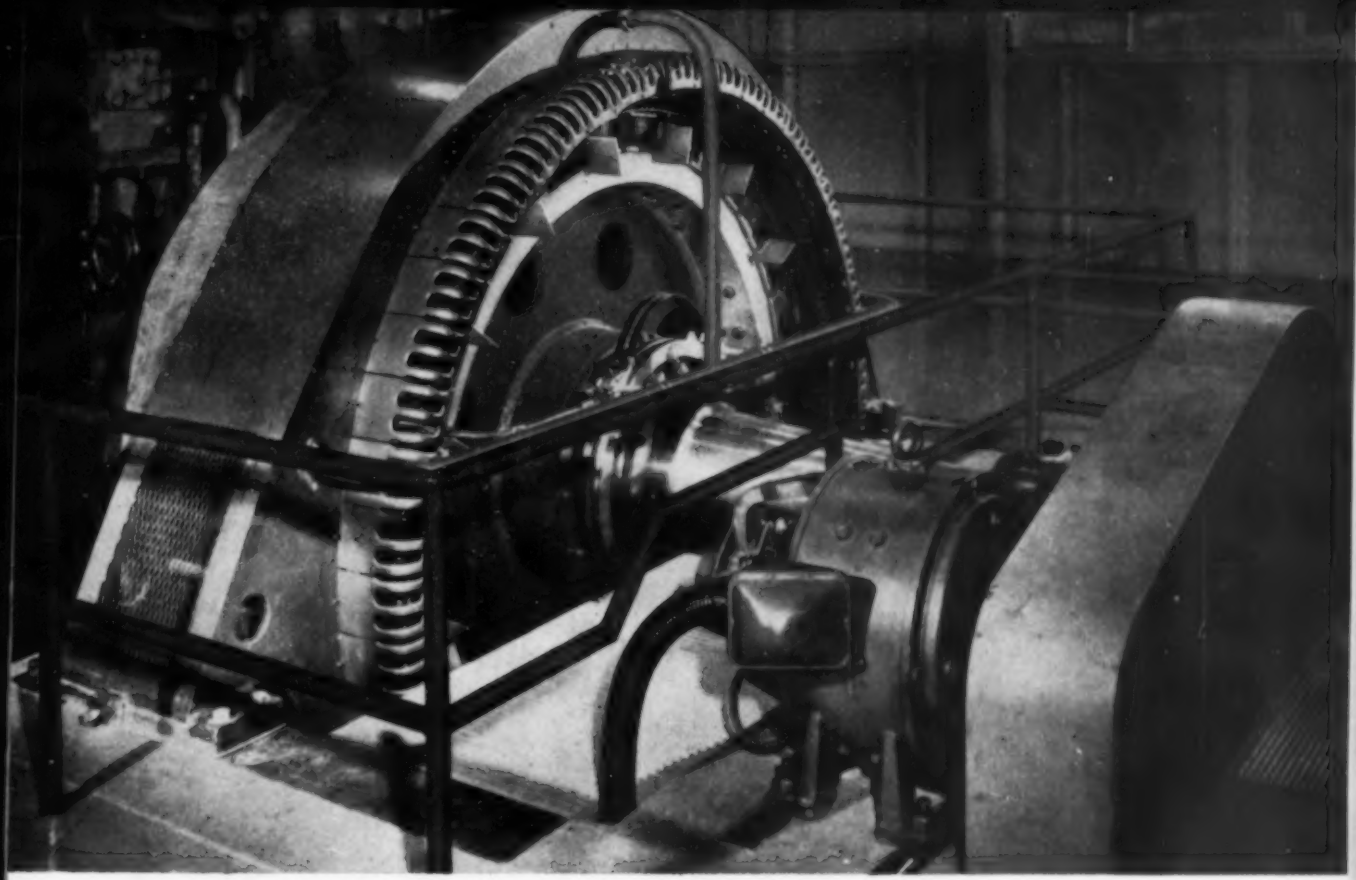
Get the full story about Malleabrasive. Write THE GLOBE STEEL ABRASIVE CO., Mansfield, Ohio.

"If you use metal abrasive, you *should* use Malleabrasive."

MALLEABRASIVE®

MADE BY THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO

World's largest manufacturers of Malleablized Shot and Grit
Established 1907



Elliott gets spider rim forgings FAST from STANDARD STEEL WORKS

Fast service on key forgings is mighty important to the Elliott Company. That's one of the big reasons why they have been depending on Standard Steel for years to supply spider rim forgings for their synchronous generators.

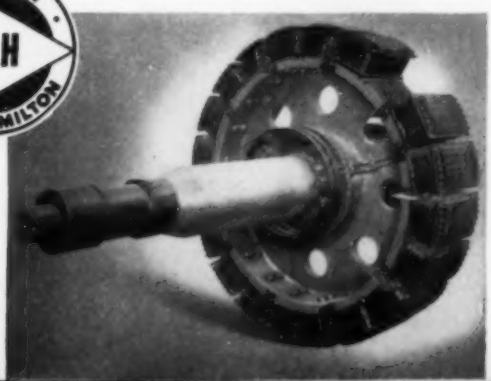
The urgent need for more and more electric power in this country makes it imperative for Elliott to keep production moving. Output would be stymied completely if they had to wait at all for delivery of their spider rim forgings which are the very heart of the rotor assembly. Fortunately they have found a truly dependable source . . . the Standard Steel plant in Burnham, Pa.

Elliott's experience is typical, because Standard Steel has unequalled facilities and experience to produce highest quality steel forgings . . . quickly and consistently. Proof of dependable performance is the continuing growth of Standard Steel for over 150 years.

Maintain your production schedules . . . improve product quality . . . by standardizing on Standard Steel as your source for forgings and castings.

For more information about SSW's ability to produce forgings and castings of unusual sizes and shapes (such as weldless rings up to 144" O.D.) please write Department 8846:

BALDWIN BLH LIMA-HAMILTON

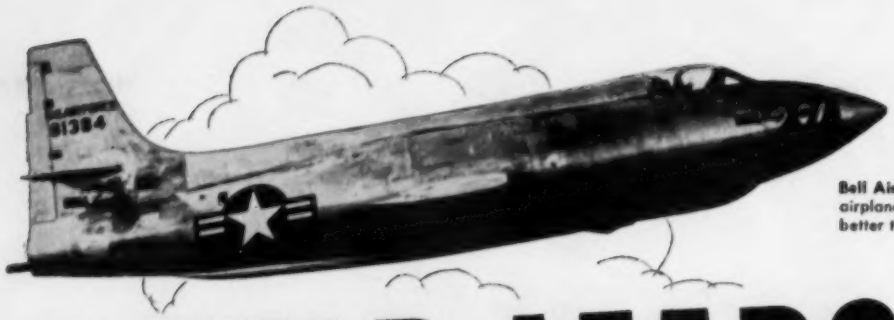


Standard Steel Works Division

Burnham (Mifflin County), Pa.

BALDWIN-LIMA-HAMILTON

General Offices: Philadelphia 42, Pa. • Offices in Principal Cities



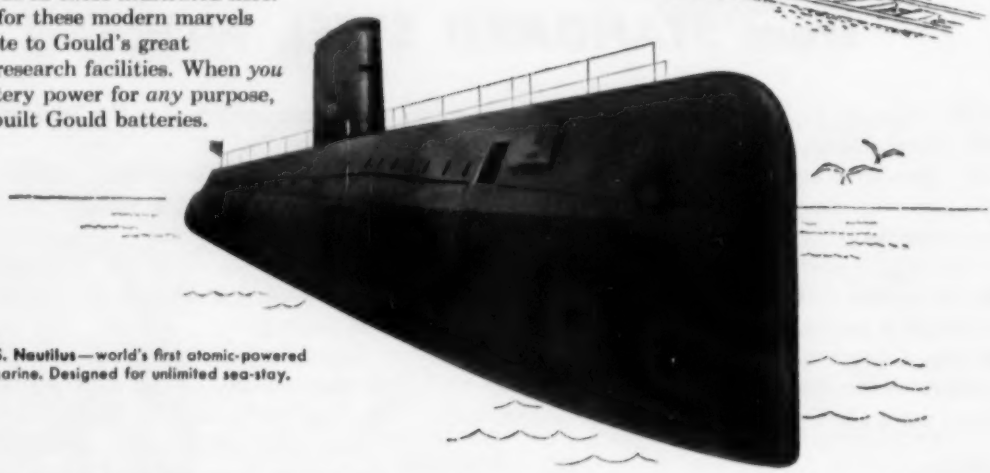
Bell Aircraft's X-1A —world's fastest airplane that broke the sound barrier at better than 1600 miles per hour.

GOULD LEADS

ON LAND, ON SEA, IN THE AIR!

Missouri Pacific Railroad's Eagle —the modern streamlined train that meets tomorrow's rail transportation needs.

DEPENDABLE storage battery power plays an important role in the record-making performance of great new scientific achievements, such as those illustrated here. Gould Batteries for these modern marvels is dramatic tribute to Gould's great engineering and research facilities. When *you* need storage battery power for *any* purpose, choose research-built Gould batteries.



U.S.S. Nautilus—world's first atomic-powered submarine. Designed for unlimited sea-stay.

GOULD
Batteries

GOULD-NATIONAL BATTERIES, INC.
TRENTON 7, N. J.

For Railroad Air Conditioning and Lighting | For Mine Shuttle Cars and Locomotives | For Electric Industrial Trucks | For Diesel Locomotive Starting | For Standby and Emergency Power

©1954 Gould-National Batteries, Inc.

Always Use Gould-National Automobile and Truck Batteries

An Old Ship

RETURNS TO INDUSTRY

Quietly and without histrionics, the career of an old luxury liner comes to a useful end under the slashing flames of oxyacetylene cutting torches. Scrapped at Seattle, the former Munson liner SS Southern Cross provided more than 9,000 tons of steel for remelt. The vast quantities of oxygen and acetylene consumed during the scrapping of the Southern Cross created scarcely a ripple in the pool of Air Reduction's resources. How large are *your* needs?

AIRCO

OFFICES AND DEALERS IN MOST PRINCIPAL CITIES

AIR REDUCTION

60 E. 42nd Street • New York 17, N. Y.

Air Reduction Sales Co. Air Reduction Magnolia Co. Air Reduction Pacific Co.

Represented Internationally by Airco Company International

Divisions of Air Reduction Company, Incorporated

Gases for the scrapping were piped into the ship from an oxygen trailer set-up and a twenty-cylinder acetylene manifold planned, and installed at the site, by Airco Technical Service personnel. Airco bulk delivery trucks provided the reliable and flexible supply needed during the job.

MAP COPYRIGHTED BY GENERAL DRAFTING CO., INC.

Each Airco trademark in the section illustrated represents an oxygen *manufacturing* plant. Additional bulk storage is maintained at many other points.

AIRCO OXYGEN AT YOUR FINGERTIPS

Throughout the country, Airco oxygen plants, with their storage facilities and their fleet of delivery trucks, provide a dependable and flexible supply, not only for your routine oxygen needs but for your peak and emergency requirements as well.

Your everyday needs, of course, are supplied from the oxygen plant nearest you, promptly and with a minimum of scheduling and transportation. But, if this plant should shut down for a few days or temporarily curtail its output (all oxygen plants must do so occasionally, for maintenance or other reasons), you'll probably never even know it. There's another Airco plant ready to back up the one that usually supplies you.

Perhaps you use oxygen and other industrial gases right in your shop. On the other hand, maybe your work is on location, like the company that scrapped the ship shown on the reverse side of this page. No matter where you work, you can count on Airco to supply the gases you need . . . in the quantities you need . . . whenever you need them.

Airco specialists can help you *use* these gases most efficiently. Let your nearest Airco office help plan the most economical supply for your needs.

"WHATEVER WE DO" — New documentary, color — sound movie tells the fascinating story of atmospheric gases in industry and in your daily life. Arrange for a free showing through your nearest Airco office.

AIRCO®

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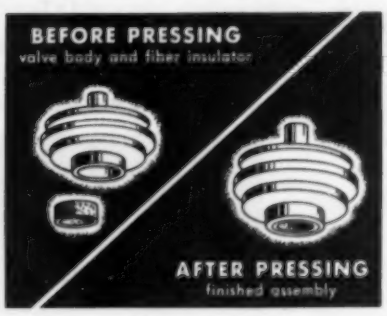
AIR REDUCTION

60 E. 42nd Street • New York 17, N. Y.

Air Reduction Sales Co. Air Reduction Magnolia Co. Air Reduction Pacific Co.
Represented Internationally by Airco Company International
Divisions of Air Reduction Company, Incorporated

At the frontiers of progress you'll find

AN AIR REDUCTION PRODUCT



4 times faster with DENISON MULTIPRESS®

FROM 7 a minute to 30 a minute—by switching to Denison hydraulic Multipress.

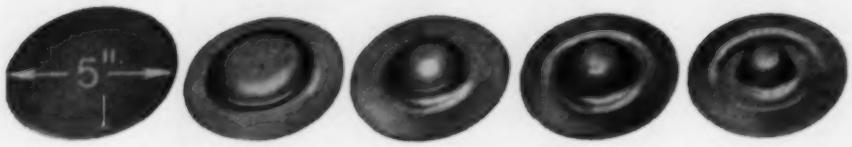
Pressing fiber insulators into gas control-valve bodies was a slow process using an air cylinder method. Now, a 4-ton Multipress does it 300% faster. The reasons: Faster loading of parts, continuous operation on preset time cycles, automatic ejection of finished parts.

With Denison hydraulic Multipress, the operator simply loads insulators on a rotary Index Table. The Index Table carries the parts under the hydraulic ram. One smooth hydraulic stroke presses the insulator into the gas control-valve body.

Denison Multipress increases production on many types of jobs in the 1-to-75-ton pressure range. Ask for cost-cutting ideas and technical bulletins.

THE DENISON ENGINEERING COMPANY
1180 Dublin Road • Columbus 16, Ohio

DENISON Hydr OIL ics



BLISS' 1000th Transfer Feed Press

***It feeds itself \ checks and corrects errors ***

***performs 11 separate press operations ***

***and delivers 28 completed parts per minute ***

all automatically

At Ford Motor Company's Ypsilanti plant, the Bliss 13-station transfer feed press turns out starter brush end plates—a part which was formerly die cast.

The press takes the 0.090-inch blank, puts it through six successive draws, flanges it, irons the cup within a tolerance of ±0.0005" on the I.D., restrikes the flange, pierces ten tiny holes, lances four locating tabs, and then trims the part to final diameter. Tolerance range throughout: from ±0.0005" to ±0.005".

And while all this is going on all the attendant has to do is keep the turret mechanism loaded with blanks!

However, the truly unusual feature of the press is this: practically everything that can go wrong has been anticipated and guarded against by electrical control circuits. Tiny switches police trouble areas and take corrective measures when needed.

In short, the press thinks as it works—*that's* automation. An up-to-the-moment example of Bliss press engineering, this transfer feed press is the thousandth such press produced by Bliss since it pioneered the transfer feed principle back in the 90's. Today Bliss transfer feed presses are a by-word in arsenals, can-making and metalworking plants—wherever speed and accuracy are musts.

If you have a pressroom problem—large or small—a Bliss field engineer will be glad to help you in whatever way he can. And behind him stands the resources of the entire Bliss organization—the world's largest press builder.

E. W. BLISS Company
Canton, Ohio
PRESSES, ROLLING MILLS, SPECIAL MACHINERY

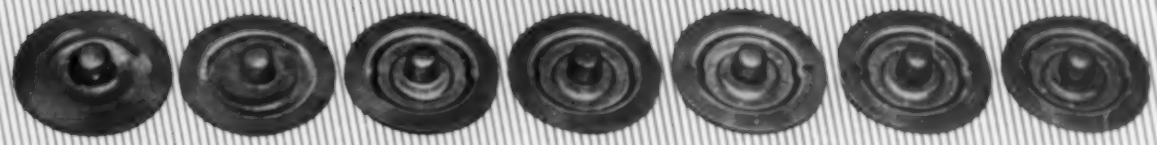
BLISS
SINCE 1857

Remember: BLISS is more than a name . . . it's a guarantee

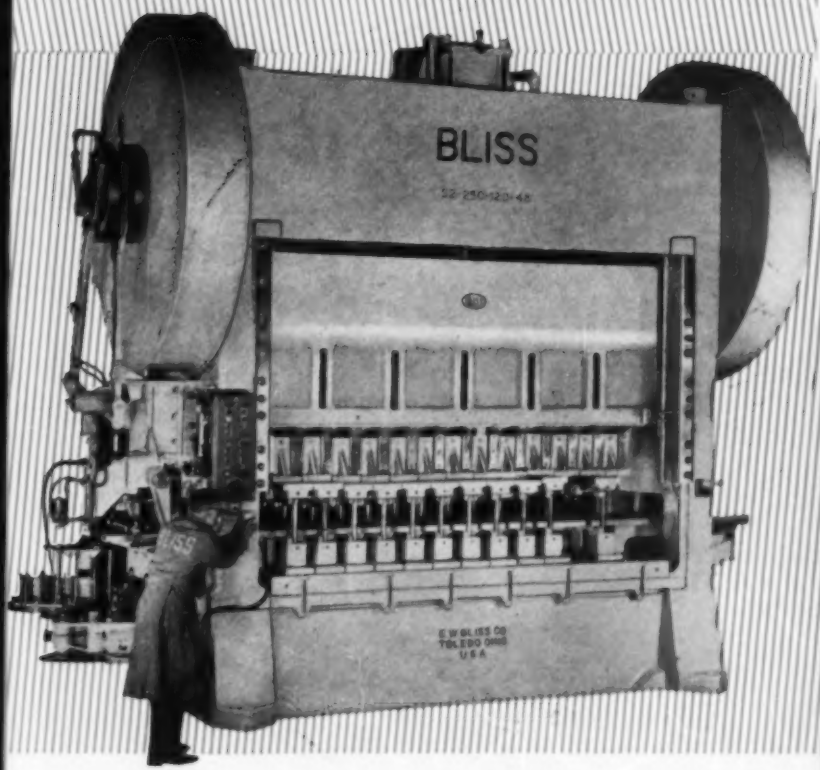
Subsidiary: **The Die Supply Co., Cleveland, O. • E. W. Bliss (England) Ltd., Derby • E. W. Bliss Co. (Paris) France**

U. S. Plants **in Canton, Salem and Toledo, Ohio; Hastings, Michigan; and San Jose, Calif.** ***Branch Offices*** **in Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Philadelphia, Rochester, Toledo; and Toronto, Canada.**

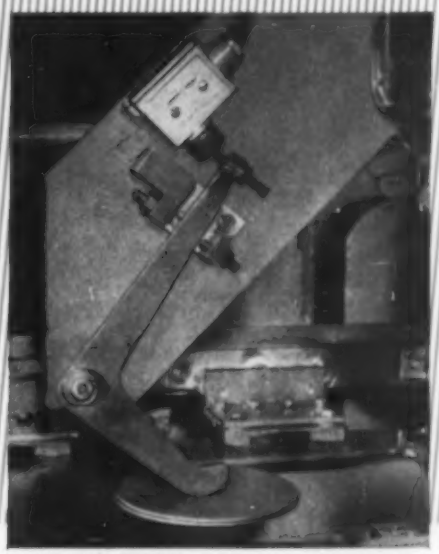
Other representatives throughout the world.



STAMPING SEQUENCE... The first six, from left to right, are successive draws. Step seven forms the flange. Eight irons the cup to size (tolerance here: 0.0005" on the I.D.) and restrikes the flange. Step nine: ten holes are precisely pierced. Next, the four locating tabs on the flange are lanced. The final operation trims the diameter all around. Blank size: 5" diameter by 0.090" thick. Tolerance range: from ±0.0005" to ±0.005". Production rate: up to 28 per minute.



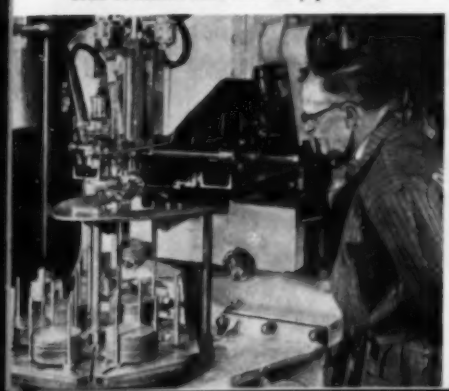
VITAL STATISTICS... Straight side double crank design; 120" between uprights; 48" front to back; single geared with twin drive; gears totally enclosed and immersed in oil bath; speed adjustment—14 to 28 spm; stroke of slide 8"—motorized slide adjustment range 10"; cam-actuated knockouts in individual slides accommodate various shell heights; high-speed single disc air clutch. Press and die design has purposely been kept flexible so that it can be readily adapted for a variety of jobs.



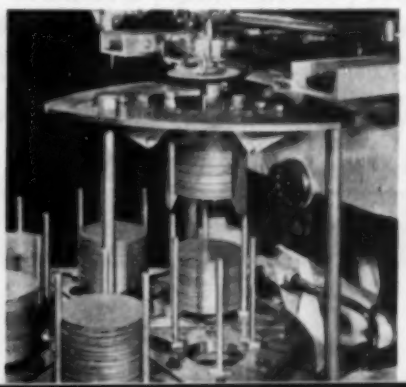
DOUBLE TROUBLE... When two blanks stick together and feed into the press, they lift this feeler, close the micro-switch and actuate a solenoid which opens a trap door in the press bed. The blanks fall through the trap door; the press goes on uninterrupted. That's typical of the many automatic safeguards incorporated into the press.

Automatic feed system: ***all it requires is loading***

OVERALL VIEW shows the position of the automatic feed mechanism at the entry end of the press. Note that one load of blanks has been picked up from the six-station turret located below. Turret now moves next load of blanks into the ready position.



CLOSER VIEW shows vacuum cup holding a single blank between the slide bars. Close examination reveals the gripping fingers which will close in on the blank, grip it and then move it into the press, release it and return to their original position.



STILL CLOSER VIEW clearly shows gripping fingers in ready position as blank is held by vacuum cup. Curved tube in foreground shoots a blast of compressed air at side of blank to force off extra blanks that may be stuck to top one.

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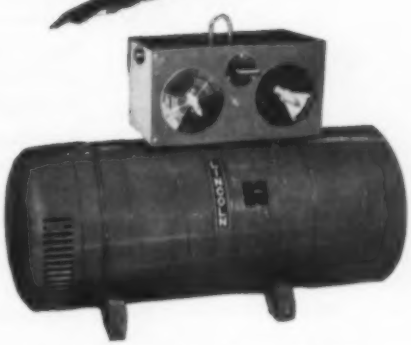

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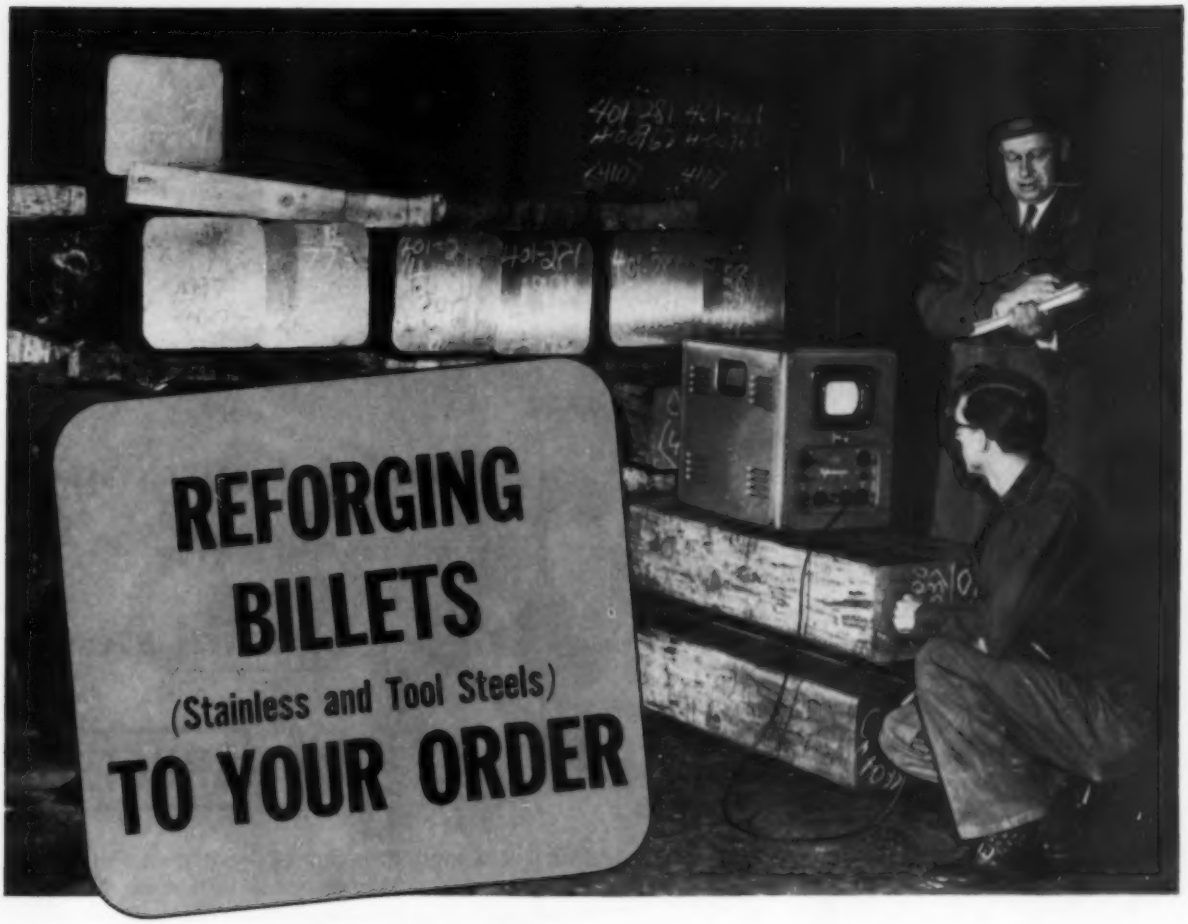

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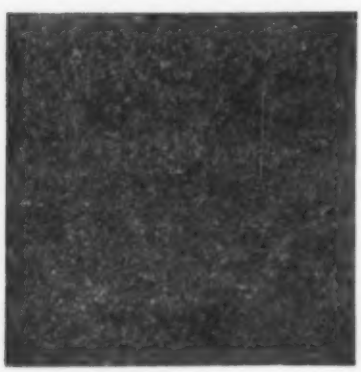

Unretouched photograph (actual size) of a typical etched section from a 15" square A-L reforging billet.

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Manager, Hydro-Arc Furnace Dept.
Whiting Corporation
Harvey, Illinois

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The Whiting Hydro-Arc Furnace which you furnished us recently is operating very satisfactorily. Anyone in the market for an electric furnace should certainly look into the merits of the Whiting Hydro-Arc before purchasing a furnace. In my opinion, it sets the pace in the industry; the Whiting Hydro-Arc is really an up-to-date furnace.

Sincerely yours,

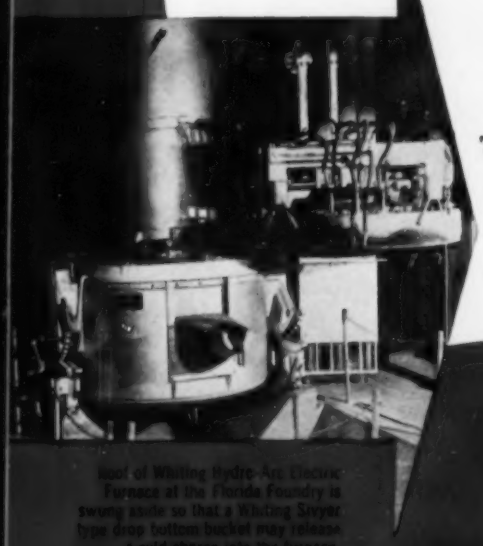
FLORIDA MACHINE & FOUNDRY CO.

Thomas W. Peacock

Thomas W. Peacock
Assistant Superintendent

TWP/wb

ELECTRIC STEEL CASTINGS



Roof of Whiting Hydro-Arc Electric Furnace at the Florida Foundry is swung aside so that a Whiting Swyer type drop bottom bucket may release a cold charge into the furnace.

Write today:

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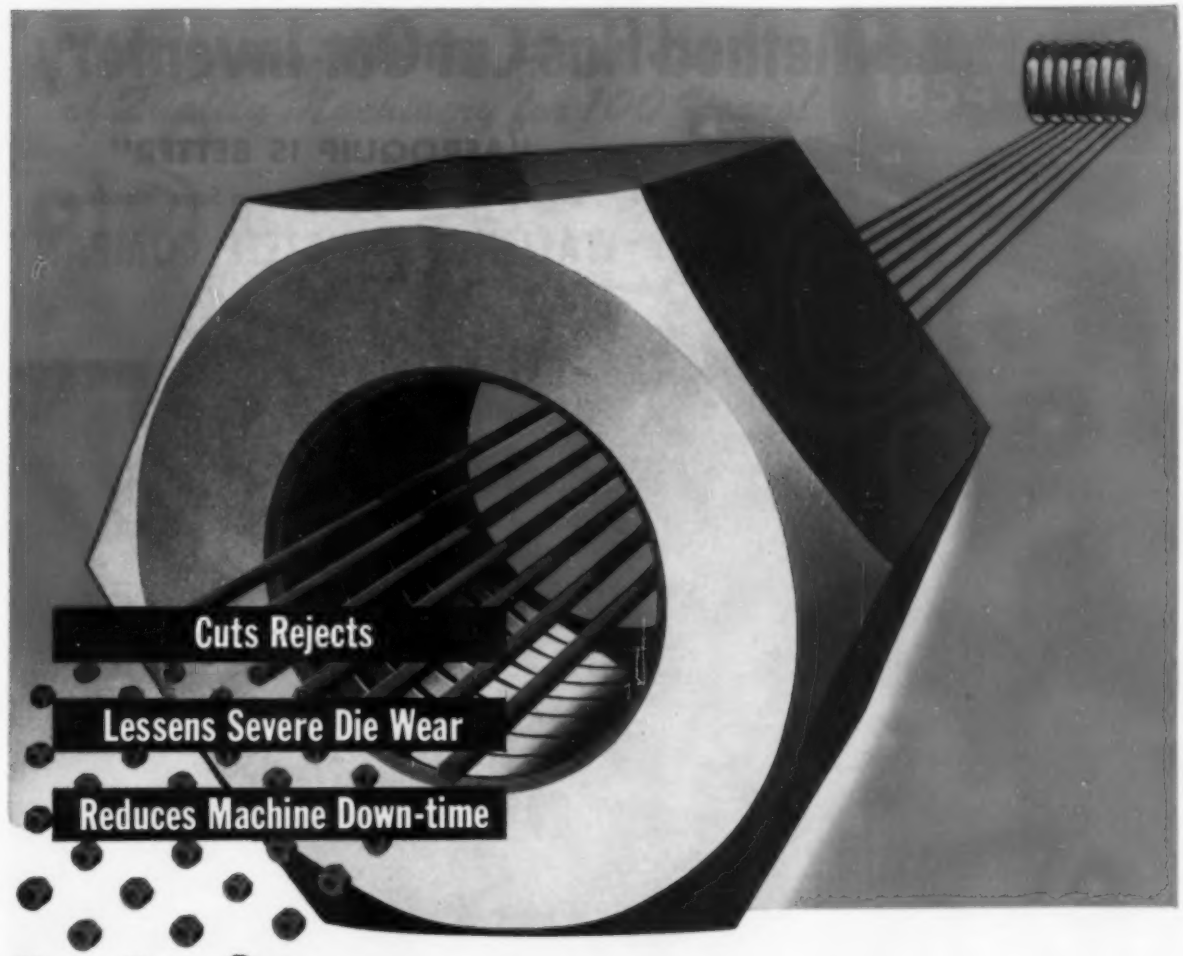

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- UNIFORMITY
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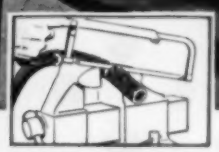
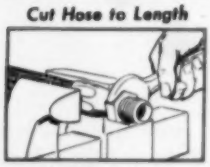
"AEROQUIP IS BETTER"

says Peter Wallace, Maintenance Superintendent,

WALLINGFORD STEEL COMPANY



Cut Hose to Length



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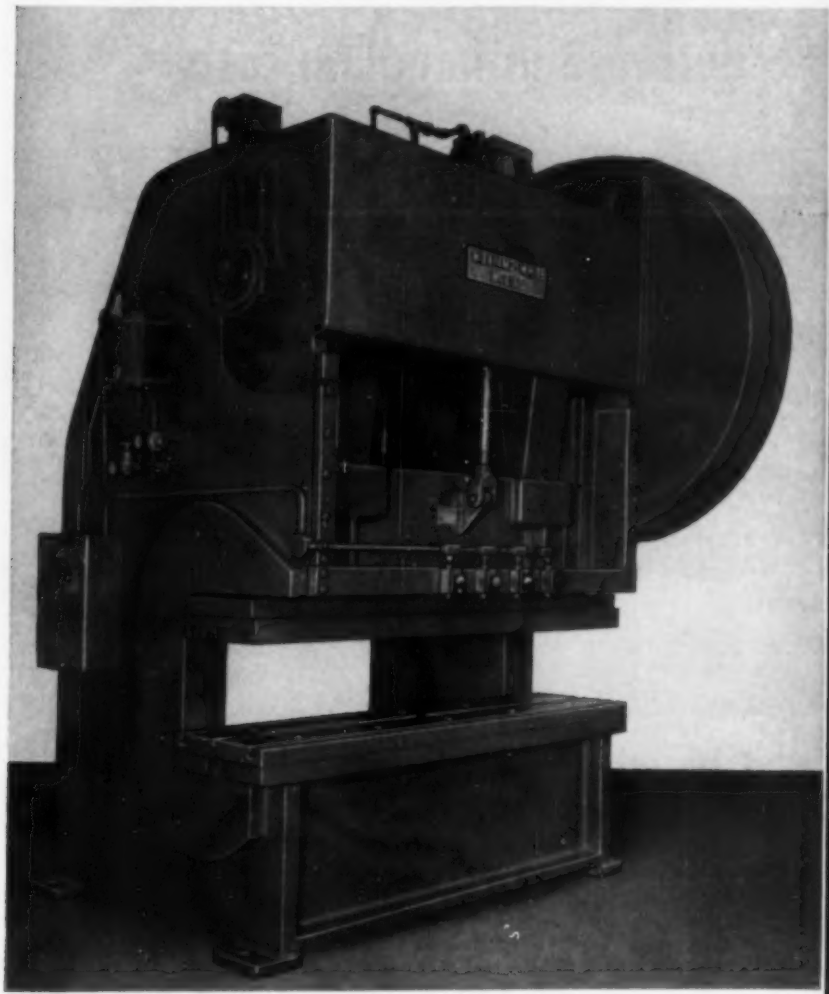

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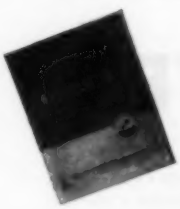
6. Improved working conditions
7. Eliminated grinding dust problem
8. Cleaned pieces formerly too costly to clean
9. Improved production flow in welding shop

McNeil Machine & Engineering Co., Akron, Ohio, realized these nine bonus benefits in its weldment cleaning department when it switched to Wheelabrator Airless Blast Cleaning. Hand grinding and chipping were replaced for removing scale, welding flux and slag from their fabricated members ranging in size from very small items to large pressure domes weighing 1500 lbs. (as illustrated above).

Six men were formerly required with these manual operations—three do the job now. Cleaning time also has been slashed — in the case of the pressure domes, for example, from 90 minutes to only 10.

There's a great deal more to this Wheelabrator case history that should be of great interest to all weldment producers who are depending upon time-consuming manual methods for weldment cleaning. The complete story will be sent upon request. Ask for Production Economizer No. 2 and for details on how the Wheelabrator can save time, money and man-hours for you, too.



Bulletin 74-B tells "What the Wheelabrator is and What it Will Do For You." Send for your copy today.

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AIRLESS BLAST CLEANING

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It was 6:45 one Wednesday evening when Bob Rans of the Chicago Sheet and Strip desk was interrupted at the chore of drying dinner dishes by a phone call. One of our good customers was in a jam and had traced Bob down at home. "If I don't get 20,000 pounds of slit coil stock tomorrow morning we'll have to shut down. Can Ryerson do it?"

Bob immediately called the sheet and strip night dispatcher and the second shift foreman at the plant. The order was added to the night schedule and was ready by dawn. At 9:45 AM the required steel—cut to size and ready to use—was set down in the customer's suburban plant.

Whether you need sheets and strip, or bars, shapes and plates, you can depend on Ryerson for prompt, personal service. We have the world's largest steel stocks—the unequalled facilities—and above all the teamwork of specialists to deliver as promised. So, when you need *every* kind of steel, be sure... call Ryerson.

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Metalworking Outlook

Nothing but Growth Ahead

"Nothing but long-range growth for the economy ahead," predicts American Management Association's President Lawrence A. Appley in the 31st annual report of the AMA. Growth, of course, depends upon several factors, but a STEEL projection (based upon 200 million population by 1975) indicates that metalworking could be enjoying $338-billion annual sales by then, compared to last year's $125.3 billion. If the 1975 figure seems high, just remember that a short seven years ago metalworking sales were only $61.3 billion annually. In 1939, they were $17.7 billion.

New Steelmaking Heights in 1960s

Adding support to the AMA president's views is L. S. Hamaker, Republic Steel Corp.'s general manager of sales. He forecasts a level of business in the first half of the 1960s that will reach heights never before approached. While he foresees steel sales in 1955 only slightly ahead of this year, he says that after 1955 the trend will be steadily upward through the rest of the 1950s. "By 1960," he says, "the steel industry may be considering plans for further expansion."

Doubling Up

Sales of stainless and silicon steels should double every ten years, thinks E. J. Hanley, president, Allegheny Ludlum Steel Corp., Pittsburgh. Growing architectural applications will be a boon to stainless. Silicon steel, often called electrical steel because of its use, will thrive from the growing use of electricity. General Electric Co. said early this year that the electric power industry may be expected to double its output by 1963. Last year mill shipments of stainless were 602,000 net tons; ten years earlier they were 269,000 tons. Silicon sheet and strip shipments in 1953 were 820,000 tons; silicon figures go back only to 1946, when shipments were 306,000 tons.

TV Eyes for Railroads

TV eyes are being put to work by Southern Pacific railroad yard officers to keep track of freight car yard movements in Los Angeles. The experimental television setup includes two TV cameras atop the general yardmaster's tower 60 feet above track level and one viewer at the terminal superintendent's desk. Wide angle and telescopic lenses give a viewing range of 2000 feet. Five or six cameras in a permanent installation would cover a 2-mile railroad yard from every angle.

Dangerous Mixture?

Is the Justice department mixing economics and politics in dangerous proportions in frowning upon the Bethlehem-Youngstown merger? Many industry men think so and point to Dow Chemical Co.'s negotiations with General Services Administration as another prime example. Dow wants

to buy the government-owned magnesium plant at Velasco, Tex., which it now operates under a contract due to expire Oct. 31, 1954. Justice turned thumbs down—violation of antitrust laws. Dow's offer is generous—$9 million, plus a percentage of output for the next 10 years (estimated at $4.5 million). It'll cost the government $3.5 million to lay the plant away, plus an extra $1 million annually to maintain and protect it from deterioration. The stew thickens with the fear of magnesium men of a possible metal shortage if new markets develop. Without Velasco's production, magnesium capacity is only slightly more than 50,000 tons annually—about the same amount as consumed last year.

Better Time Break for Defense Bids

If you're not currently on the Defense department's "established contractor list," a new procurement policy will give you a better time break on getting proposed military procurement information to compete for contracts. At present nonsecret procurement proposals of $25,000 or more are published daily by the Commerce department. Up to now this notice has not been given until specifications and other information necessary to prepare bids were established and ready for mailing to contractors on the source list. Now, the proposed procurements will be published at least 10 days before distribution of bid information. This will give firms not on the list time to request the information at the same time it goes out to list firms.

CIO—"Labor's Not a Commodity"

The CIO has protested recommendations that the U.S. attorney general's committee to study antitrust laws widen the scope of antitrust legislation to include labor unions. Antitrust laws, says the CIO, are to preserve competition among business enterprises manufacturing and selling products. "Unions are not engaged in any such activity, unless we . . . stipulate that human labor should be regarded as a commodity."

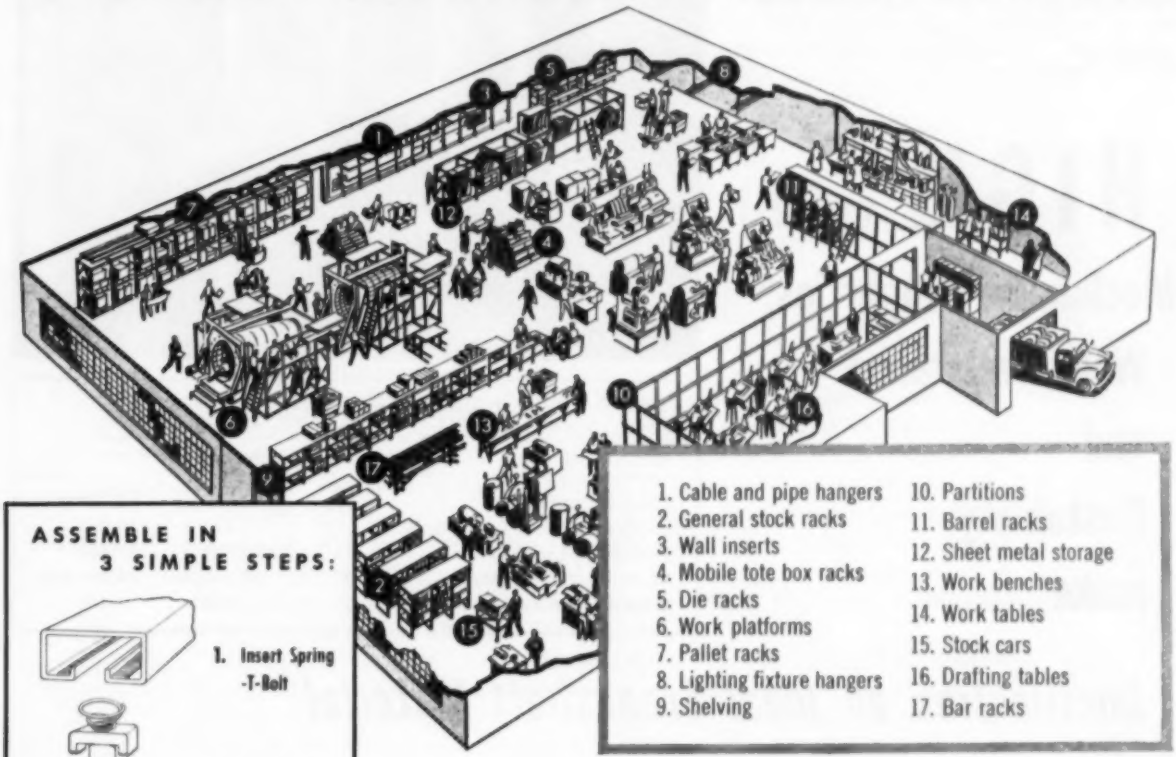
This Week in Metalworking

The federal government's $20-million allocation (to be matched by local government funds) for airport construction and improvement adds momentum to the fast-rolling construction pace . . . National Association of Real Estate Boards will push for legislation next year to get much federal real estate on local tax rolls . . . The Army and Walter Motor Truck Co., Long Island, are testing a new military fire truck with an enclosed cab large enough to accommodate six men and to operate in a temperature range from 65 degrees below zero to 125 degrees above.

Straws in the Wind

Better watch your buying and selling patterns in the current wave of mergers (p. 63) . . . Minneapolis-Honeywell Regulator Co. and its union have teamed up to cut costs (p. 65) . . . Business car expenses add up. Make sure your program fits your operations (p. 67) . . . Scaffolding sales are riding the construction wave (p. 69) . . . For a glimpse at what's involved in getting a new auto model into production, see p. 77.

17 places you can save on costs with one material...MULT-A-FRAME!



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3. Wall inserts
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6. Work platforms
7. Pallet racks
8. Lighting fixture hangers
9. Shelving
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11. Barrel racks
12. Sheet metal storage
13. Work benches
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15. Stock cars
16. Drafting tables
17. Bar racks

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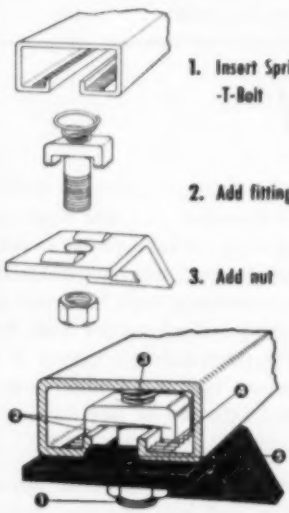

1. Insert Spring -T-Bolt
2. Add fitting
3. Add nut

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2. Arms of T-Bolt *overlap flange of channel*, prevent spreading.
3. Spring holds T-Bolt in place for positioning of all fittings before tightening.
4. Contact points on T-Bolt fit in serrations rolled in frame. Assures firm joint without excessive wrench torque. *Bolt does not have to cut its own serrations; does not crush flange.*
5. Raised nubs on Safe-Locking Fitting "key" into slot, giving rigid box joint; prevent Fitting from rotating.

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As shown in the "plant" above, you too need only one basic material, MULT-A-FRAME; to solve not only your framing and racking problems, but many others . . . in every department.

MULT-A-FRAME's 3 basic parts assemble by hand with a common hand wrench. Channel Frame, Spring-T-Bolt, and a wide variety of fittings can be combined to let you build assemblies of unlimited size and shape.

Use MULT-A-FRAME over and over. No matter how you assemble it initially, it's never obsolete. When your present need passes, disassemble it and convert it to new uses. You save because *you never scrap it.*

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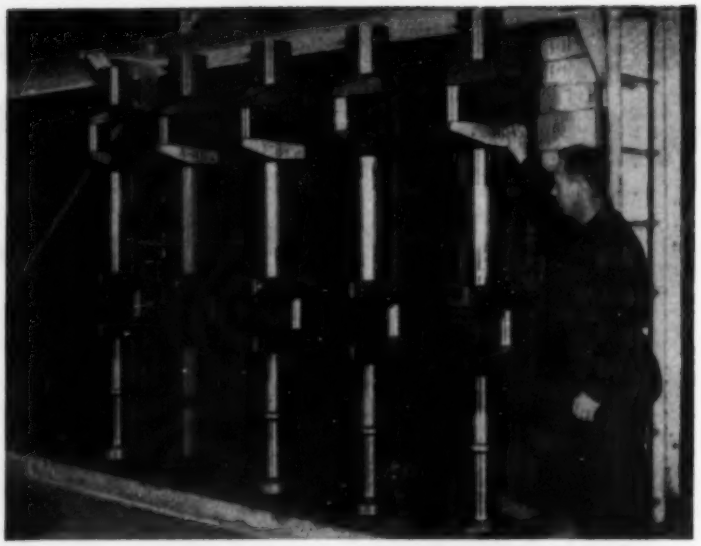
Ductile Iron Crankshafts cast at The Cooper-Bessemer Corporation's Mount Vernon, Ohio, foundry and machined at its plant in Grove City, Pa., for GMX-4 engines. The first of this model equipped with a ductile iron shaft was shipped in June, 1953. Cooper-Bessemer initiated development work on high test irons for crankshafts in 1935. Some mechanical properties of ductile iron, compared with those of forged steel . . . traditionally used for crankshafts . . . are shown below.



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Mechanical Properties, Wear Resistance and Castability make

Comparative Properties		
	Ductile Iron	Forged Steel
Tensile Strength	79,200 psi	80,100 psi.
Endurance Limit (Smooth bar)	31,500 "	35,000 "
Endurance Limit (Notched bar)	20,750 "	17,800 "
Modulus of Elasticity	22,600,000	29,000,000
Brinell Hardness	220	170

Ductile Iron an Ideal Crankshaft Material

Wouldn't you rather *cast* a crankshaft than block forge it?

Wouldn't your costs tumble for every unit with bearings cored out, counter-weights molded on, and the entire piece cast within tolerances that reduce machining to a minimum?

And wouldn't the excellent castability, toughness, stiffness and machinability of ductile iron bring you advantages like those brought to Cooper-Bessemer?

Glance at the tabulation. You'll see a few reasons why Cooper-Bessemer concluded that ductile iron provides the best combination of properties offered by any material they have tested for crankshafts.

The damping capacity of ductile iron is excellent . . . less than that of gray iron, but far superior to steel. Especially valuable in crankshafts is the relatively high "notched endurance limit" of ductile iron. And another outstanding property is its resistance to mechanical wear... under lubricated or non-lubricated conditions.

Combining the *process advantages* of cast iron and the *product advantages* of cast steel, ductile iron has, actually, many applications.

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Horse and Buggy Laws

Recently, Attorney General Herbert Brownell Jr. talked to the Public Relations Society of America about the nation's antitrust laws. He hinted that the administration in Washington is not satisfied with the hodgepodge of antitrust, restraint-of-trade and similar laws now on the books or with the confusion attending their interpretation. He hopes that a committee now studying the problem will come forth with constructive suggestions on how existing legislation may be improved to cope adequately with current social and economic conditions. The committee's report should be available in six weeks.

To the old timers, Mr. Brownell's desire to clarify laws pertaining to the regulation of business is like replaying an old record. In 1954 he hopes that his competent committee will be able to present a clarification of all of the antitrust laws from the Sherman Act of 1890 to the latest modification of the Clayton Act of 1914 and 1950.

In seeking this clarification, he is following in the footsteps of Herbert Hoover, who, as secretary of commerce in the early twenties, asked the then Attorney General Harry M. Daugherty to clarify the antitrust laws so that industrial executives might have at least a rough idea of what they could or could not do legally.

Secretary Hoover was unable to obtain a satisfactory answer. Three decades have passed, and still no acceptable answer has been forthcoming. Meanwhile, thousands of companies have been brought into federal courts for alleged violations of antitrust and restraint-of-trade laws. Some, actually guilty, have pleaded guilty and paid their fines. Many others, not guilty, have pleaded guilty and paid nominal fines to save money under the terms of the tricky "consent decree" procedure.

It is utterly ridiculous to think that our government can regulate the activities of modern business justly on the basis of rules stemming largely from legislation passed as early as 1890 and 1914. It is to be hoped that the committee mentioned by the attorney general can submit really constructive suggestions. If it does, no time should be lost in modernizing our antiquated antitrust laws.

E. C. Shaner

EDITOR-IN-CHIEF

CLARIFICATION NEEDED: Attorney General Brownell's talk to public relations practitioners ten days ago probably was timed to provide a tentative answer to the question of how the Justice department regards the proposed merger of Bethlehem Steel and Youngstown Sheet & Tube. Mr. Brownell said the government looks upon the proposed deal with dis-

favor because it would be in violation of the action of congress in 1950.

It will be remembered that the Clayton Act of 1914 prohibited corporations from acquiring stock in other corporations to create a monopoly. Some corporations got around this restriction by buying the assets of a corporation instead of its stock. In 1950 Congress blocked this loophole.

Just how the Bethlehem-Youngstown, Studebaker-Packard, Nash-Hudson and the wave of smaller proposed or consummated mergers (p. 63) differ in relation to antitrust legislation will be determined on razor-thin points of law. That is why clarification of these laws and their interpretations would be a godsend.

AVOIDING COMPETITION: In general the Justice department takes the stand that one criterion of whether a proposed deal is permissible is "Does it impair competition?"

Some companies thrive on competition; others loathe it. During World War II a visitor was ushered into the office of the president of a small crane and hoist company. To the opening question, "How's business?" the president replied by picking up a pile of government invitations to bid on scores of standard cranes and hoists. "See these," he said. "They represent perhaps $200,000 in business, but being of standard design the orders will go to the lowest bidders. Sure, we take some of this business, but more often than not we look for a job where there are special requirements which enable us to introduce a bit of engineering."

In many cases, the opportunity to do a custom-tailored job instead of supplying a standard product carries the manufacturer out of the range of direct price competition.

A LESSON IN BIDDING: As if to illustrate this point, the president asked his visitor to go into the shop to see a special job. "Here," he said, "is a traveling crane of less than 40-foot span but with structural strength far beyond anything that anyone can conceive to be necessary. It is powered with motors of fantastic capacity."

"It's odd how we got this job," continued the president. "Every cranemaker in the country was invited to bid. We looked at the specifications and quickly came to these conclusions: 1. The company's engineering talent is tops. 2. The specifications, fantastic as they may seem, indicate that the company probably has a government contract of great secrecy. 3. We'll bid on the specifications with complete faith that the buyer knows what he wants."

The small crane manufacturer got this big job. His competitors lost out because they questioned the specifications, sought secret information and otherwise threatened to "gum up the works."

JOBS NOT STATIC LONG: No. 9 in this publication's series of articles on management problems deals with the all-important role of the foreman. In recent decades his place in the first line of the management team has been one of constantly increasing responsibility. Today, with the return of keen competition in almost every branch of industry, one of the most direct challenges confronting management (pp. 103-110) is that of making more effective use of foremen.

This will require not only close attention to such fundamentals as the proper selection, training and supervision of foremen, but also a much more accurate understanding of how relations between foremen and men they supervise change from time to time. Few foremen's jobs remain static long. Detecting new problems before they develop into serious difficulties is an important function of good management.

UNIQUE CO-OPERATION: In reading many newspapers published by labor unions, one gains the impression that union bosses constantly are urging their editors to print stuff that will inflame union members against their employers.

It is for this reason that one welcomes heartily the occasional instances when the members of a union co-operate enthusiastically with management in a program that will be beneficial to employees and employer. Minneapolis-Honeywell (p. 65) recently launched an elaborate cost reduction program. Employees, who belong to one of the American Federation of Labor's unions, quickly grasped the significance of cost reduction and pitched in eagerly to make the program successful.

More of this sort of co-operation would benefit everybody.

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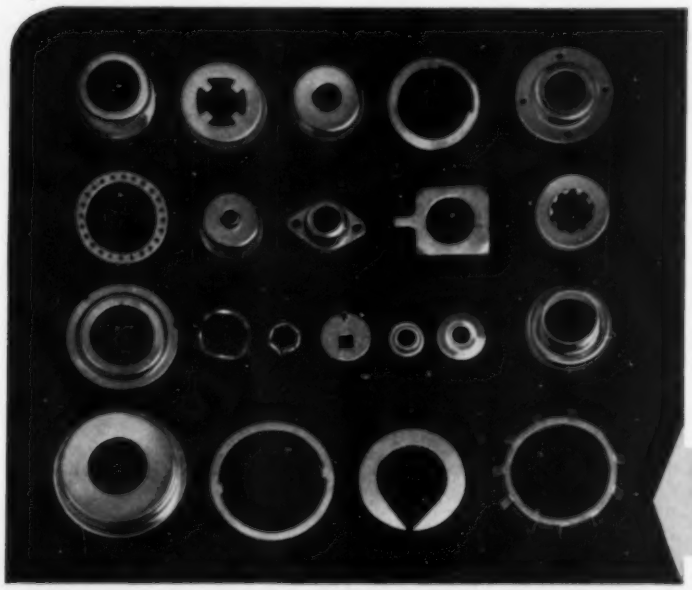

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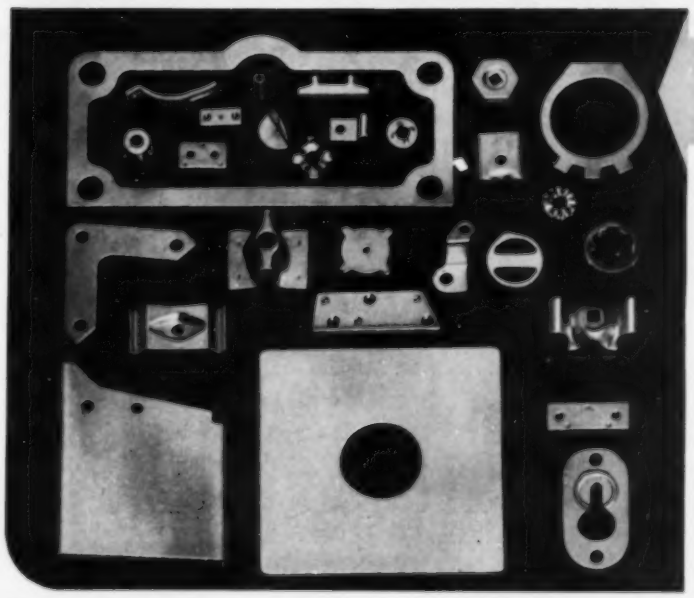

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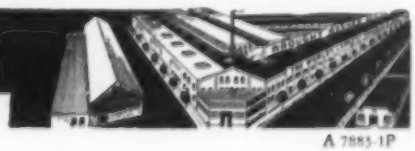

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The Urge To Merge Grows Stronger: Disruptions Now, Expansions Later

We're in another wave of mergers comparable to that of late 20s and early 30s. This one's different though. Consolidations now are mostly well-calculated to expand long-range markets

WATCH your business relations during the present wave of mergers. You may find your best customer has married your strongest competitor.

Of course, there's nothing new or disruptive about a merger unless too many companies get into the act, which is exactly what has been happening since the end of the Korean war. Now the merger snowball is bowling over two or three companies a day. And, says W. E. Hill, president of W. E. Hill Co. (a consultant firm specializing in mergers and diversification), "I think the uptrend is here to stay."

The Difference—But there is a strong note of optimism in that prediction. Many agree this period of company consolidation is predicated on growth factors.

Previous merger manias, like the one of the late 20s and early 30s, combined the feudal idea of building a castle big enough to repel any sort of attack plus the idea that, if a big company were profitable and efficient, an enormous one would be more so. The end result was fewer companies and fewer customers.

Unforced—The present merger trend does not stem from a contractive philosophy. In large part this wave of mergers is the result of long-range planning for expansion. Companies thinking about potential sales and markets 5 and 10 years hence are acting now to be ready then. In the long run, these mergers are going to mean more business, not less, over-all.

An example of how mergers plant the seed of further growth is explained by Roy C. Ingersoll, president of Borg-Warner Corp. Says Mr. Ingersoll, regarding his company's acquisition of Weston Hydraulics Ltd., North Hollywood, Calif.: "This move is the initial step leading toward even further expansion of our corporation's manufacturing activities on the West Coast."

Shallow Explanation—The popular explanation for the current ground swell—increasing competition—explains some present-day consolidations to be sure. It doesn't explain the Borg-Warner move, though, nor many others. Most of today's industrial mar-

Merger of the month, Studebaker-Packard Corp., is shooting for a 66-per-cent increase in its share of the auto market for 1955. J. J. Nance (S-P president), P. G. Hoffman (S-P chairman) and H. J. Vance (S-P chairman, executive board) clasp hands as associates instead of rivals

NEA

riages are not shot gun affairs. It just happens that competition has returned about the same time companies have time to think and plan for the future. Wartime mobilizations are not conducive to such long-term planning.

Keep Eyes Open—While many of the current combinations will mean more business in the long run, traditional supplier-fabricator-merchandiser patterns may be torn up in the process. Therefore, metalworking managers must keep an eye on mergers to be sure that their relations with customers remain strong, that their industries maintain a needed place in the whole economy.

Suppliers to Kaiser, Willys, Nash, Hudson, Studebaker and Packard had to burn much midnight oil deciding: 1. What these automotive mergers meant to their markets; and 2. what they, as supplier firms, could do about it. Competitors of Bethlehem Steel Corp. and Youngstown Sheet & Tube Co. had similar sessions when that proposed merger was first announced.

Similar Cases — Those are all well-publicized and significant mergers, but the same sort of disruption of buying and selling patterns occurs in less publicized consolidations. For example, Reo Lawn Mower Division of Reo Motors Inc. has been purchased by Motor Wheel Corp. Production of the power lawn mowers will still be carried on in the same city, Lansing, Mich., but consider changes caused by this merger: Reo Motors, building both heavy trucks and lawn mowers, had one set of suppliers, one set of costs, one set of distributors. Motor Wheel, which will integrate production of power lawn mowers with its Duo-Therm line of appliances, has another set of suppliers, another set of costs, another set of distributors. Suppliers to both firms will be affected.

Judging what any particular merger or series of them will mean to your business is not as complicated as it sounds.

Gages and Thumbs—Using the following rules of thumb will give a fairly accurate measure: Check the merger or mergers in question against the list given below to find out what advantages were gained through the consolidation; measure what was gained against what your firm can offer. Can your firm still offer the same product or service as cheap or cheaper? If so, you're sitting pretty. If not, there may be trouble ahead. Maybe you should consider merging with another firm to gain the advantage in question.

Here are the advantages to be gained through mergers: 1. Economies in either production costs, sales costs or purchasing; 2. strengthening distribution, either opening new territories or covering old ones better; 3. gain in personnel, either in capable young men or in know-how; 4. gain in service resources, such as research and development facilities; and 5. diversification into new products. Two other reasons for mergers would account for the many of the remaining unexplained consolidations: Tax and bookkeeping provisions (the Kaiser-Willys deal) and simple inability of a company to keep up in a competitive market.

Watch Carefully—Keeping an eye on mergers is one good form of insurance that your company won't have to merge for the last reason above. And it is possible that you can turn the merger-urge to your own advantage.

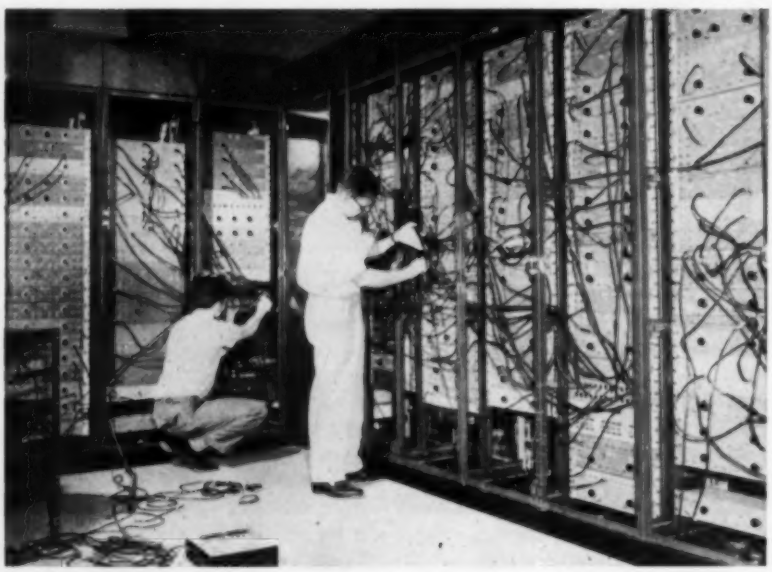
For instance, Studebaker-Packard says it is out after 4 per cent of the 1955 auto market compared to a combined total of 2.4 per cent at last count as independents. If Studebaker-Packard plans materialize, the merged company will be twice as good a sales prospect as Studebaker and Packard were when they stood alone.

Business on the Level

Industrial activity in 1955 forecast at about this year's volume. Construction to continue high

NEXT YEAR will be a period of over-all business stability at about the current level, says Bennett S. Chapple Jr., assistant executive vice president, U. S. Steel Corp.

Analyzing prospects for steel, he believes construction put in place this year will total an all-time record of $38 billion, and that next year's activity will continue high. He looks for a further reduction in industrial construction and pipeline projects, but foresees a continued high level of highway construction and thinks hous-



Giant Brain Memorizes 5300 Numbers

Heart of this UDEC II computer, constructed by Burroughs Corp., is a memory drum that can memorize 5300 numbers. Five miles of cable go into the 60-foot long cabinet. When UDEC's 3200 vacuum tubes and 7100 crystal diodes go to work, it takes a seven-and-a-half ton air conditioner to keep the giant machine cool

ing starts will again be over 1,000,000 units.

Sees Auto Output Drop—Production of cars and trucks in 1955 should be about 6,000,000 units, off 5 to 10 per cent from this year. Machinery reached a postwar peak in 1953 and will probably drop about 12 per cent this year. He anticipates an additional drop of 10 per cent in 1955.

"Careful analysis of practically all components of the machinery industry shows continuing signs of weakness," he says. "One major exception is electrical machinery and equipment."

Speaking before the National Association of Sheet Metal Distributors and the National Hardware Association in Atlantic City, Mr. Chapple pointed out that construction, automobile and machinery industries are collectively responsible for over 60 per cent of total steel demand.

He expects little change in oil and gas drilling, agriculture and appliances. Railroads and shipbuilding will be down from this year, also ordnance.

Defense Needs Down — "As a large portion of defense funds is directed toward research and technical development, production of major steel-using items, such as shells, tanks and artillery, will be reduced."

The container industry will consume more steel, benefiting from the rapidly expanding market for canned soft drinks. This market has mushroomed beyond expectations, he says, and promises to continue its rapid rate of growth for several years.

August Payrolls Up

Total payroll of the iron and steel industry is estimated at $238,778,000 in August this year, as against $232,796,000 in July. This brought industry's total wage bill for the first eight months of 1954 up to $1.91 billion.

The figures are from the American Iron & Steel Institute. Average hourly payroll cost of wage earners was $2.356 in August. This figure was second high for 1954, exceeded only by July's $2.368.

Estimated employment in August was 601,400; average hours worked weekly, 35.1.

In antiwaste garments, labor (AFL's Wishart), military (AF's Talbott) and management (Honeywell's Wishart) symbolize spirit of co-operation as . . .

Labor Joins M-H Management Team

IN RECOGNITION of the mutual interests of both labor and management in the welfare of industry, the union at Minneapolis-Honeywell has joined that company in an all-out fight against waste.

The joining of hands is the start of a long-range campaign. The company and local 1145 will strive to keep Honeywell healthy and growing by reducing production costs to meet stiffening competition.

The campaign was officially launched at a mass meeting on Oct. 3 in the Minneapolis Auditorium. Harold E. Talbott, secretary of the air force, the guest speaker, gave national significance to the meeting and helped bring home its importance to employees.

In Same Boat—It's only coincidence, but the representatives of labor and management in the entente go by the same name — they're not related. Paul B. Wishart, company president, spoke for management, and Robert I. Wishart, secretary-treasurer of the union, expressed labor's viewpoint.

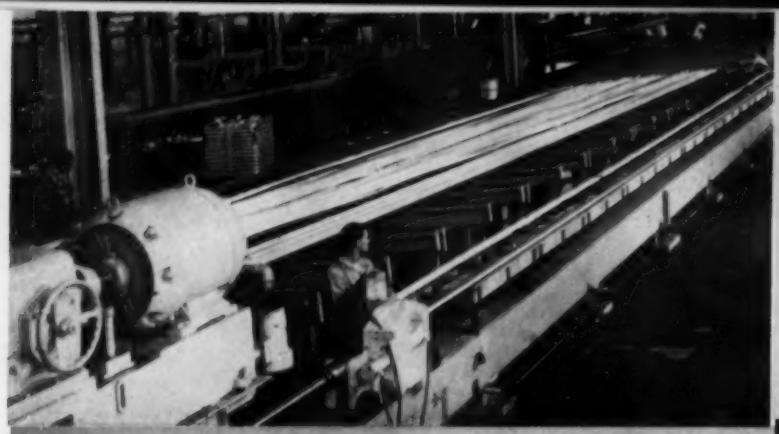
Representing 8000 production employees, Robert I. Wishart emphasized that the union was a "full and aggressive partner" in the movement and that its representation of members in other matters would in no way be affected. But he pointed out: "We want the Honeywell company to be as competitive as we can make it; a fair profit to the company means better wages, hours and working conditions for our members."

Meeting of Minds—Maturity of the union attitude was underlined when the union official went on to say that in addition to job security for union members, company prosperity also was closely tied in with the welfare of the community and with that of the nation.

Paul B. Wishart, Minneapolis-Honeywell president, backed the union representative fully.

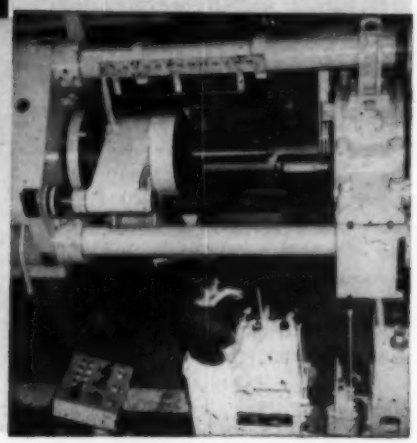
The joint sponsorship of the antiwaste campaign, the president remarked, "is a milestone in what have long been good relations here at Honeywell." He explained that union and management's progressive record across the bargaining table meant that they both have come to an understanding of what constitutes real security and how it is obtained.

"It means," he said, "that we appreciate that the chief means of attaining individual security is through dependable jobs and that dependable jobs can only be found in companies that are healthy and growing."



75,000-lb stretcher next to heat treating and finishing departments

One of two 2500-ton hydraulic extrusion presses at Vancouver plant



Alcoa's New Extrusion Facilities Keynote Growth of Aluminum Usage in Pacific Northwest

ALCOA is racing to keep ahead of growth in aluminum fabrication in the Pacific Northwest.

Latest addition: The area's first major extrusion operation at Aluminum Company of America's Vancouver, Wash., plant. The facilities add $7 million to Alcoa's $78-million investment in the Northwest.

Giant Steps—"This new installation enables us to provide the kind of service manufacturers in this area need to compete effectively on the nation's markets," says E. D. Mairs, Alcoa's Vancouver fabricating division manager. "Those manufacturers working with aluminum have shown more than a 25-per-cent gain in just three years, and we believe the trend will continue."

The extrusion operation, increased rod, wire and transmission cable capacity and a new ingot casting unit make the Vancouver plant a three-headed giant. It's located on the site of the Vancouver smelter, where in 1940 the first aluminum smelted west of the Mississippi river was produced.

Big Squeeze—Extrusion facilities are anchored by two 2500-ton hydraulic presses, with highly automatic ingot-heating and conveyor equipment. The presses handle dies up to 16 in. in diameter and 5 in. thick.

Extruded shapes can be stretched on either the 75,000-lb or 50,000-lb stretcher, then sawed to specification. After inspection for surface, quality, dimensions and angularity, the metal is either heat treated, aged or shipped.

Inside the Plant—Heat treating is handled in an upright furnace, which can take extruded shapes up to 42½-ft long. Finishing work includes use of a contour machine to correct angularity and contour, a machine to remove bow, an untwister and an arbor press to correct bow in heavy sections.

A significant aspect of the facility: It's laid out to accomplish future expansion smoothly.

Market Study—A recently released Stanford Research Institute report on the consumption of aluminum in the Northwest gives good reasons for future expansion plans. A regional population increase of some 3 million people in the next 20 years is predicted. This will call for a million new jobs.

Much new employment will be found in the aluminum industry, SRI says. The area will be more and more suited to increased use of the light metal (aluminum production in the Northwest is about 38 per cent of the U. S. total).

For Good Reasons—Reasoning behind SRI opinion: Many of the fastest growing industries in the area (transportation and marine equipment, architectural construction, food processing and agriculture) lean heavily on aluminum products; this region is growing faster than the U. S. as a whole, stressing such aluminum-use industries as building construction; capital investment for aluminum product firms often is quite small, which makes this type ideal for the Northwest, where moderate-sized industry predominates.

Alcoa's new installation is geared to provide just the proper service for small manufacturers, says Mr. Mairs.

Added Effect—Even though the capital investment in the new extrusion facilities may not bulk too large, it's an important milestone in the Pacific Northwest. Alcoa's move has the effect of satisfying present demand and fostering future demand.

Are You Paying Too Much for Auto Expense? Take a Look at Costs Under Alternative Plans

DID YOU know that about 25 per cent of the cars sold in key metropolitan areas are registered to business firms? That 77 per cent of overnight business trips are made by car?

Unimportant statistics like those make the point that the automobile is an important item in business operating expense for many firms. As many companies plan to put more salesmen on the road (and squeeze operating expenses as much as possible at the same time), the basic economics of business car expense are getting a close look.

Fleet Operations Up—To bring you up to date, allowances on employee-owned cars came up, then began to level off in 1953. A somewhat smaller increase in the operation cost of company-owned vehicles has led to a trend toward company ownership. According to a survey by Dartnell Corp., Chicago (from which much of the following material is taken), the number of cars in company fleet operation has doubled in the last two years, while the use of employee-owned units has dropped 25 per cent among firms sampled.

The cost of operating a company-owned car is about 5.75 cents a mile. Average allowance of 7 cents per mile is granted employees who use their own cars on company business. Changes from employee-owned to company-owned vehicles usually involves inducements to new men and better control of employees.

Company Ownership Cheaper—Is company ownership for you? It's the cheapest of general plans in use. It permits vehicle uniformity with late-model, low-maintenance-expense cars. It gives opportunities for reciprocity in purchasing and the ability to take advantage of car markets both new and used. Advertising is possible through car signs; regular maintenance and safety inspection do not waste employee time.

Company-ownership has disadvantages. A large capital investment is required, and the company is legally liable for accidents. Costs cannot be currently expensed, and executive and administrative time is essential to proper fleet operation. Personal use of the car is difficult to prevent if it is not permitted. Driver dissatisfaction may result from no choice in the make of car he drives or decisions involved in the inevitable problem of who is to get a new vehicle. Then, too, there is more abuse of company-owned than of personally owned cars.

Leasing—This is an alternative being adopted by a growing number of companies. Auto dealers and auto manufacturers are getting into the field, as well as a number of new fleet operating companies formed for that purpose. Only slightly more expensive than company ownership (and still con-

Breakdown of mileage being allowed on cars owned by employees:

ALLOWANCE PER MILE	PERCENTAGE
5 cents	7
6 cents	19
6½ cents	2
7 cents	45
7¼ cents	3
7½ cents	2
8 cents	16
9 cents	3
10 cents	3

Where the cars come from:

47 per cent have salesman-owned cars.

16 per cent have company-owned cars.

33 per cent have combination plans.

4 per cent have leased cars.

siderably under the cost of employee-ownership plans), leasing leaves free capital for other purposes.

Other advantages are cost control and simplified budgeting, avoidance of mileage allowance arguments with employees, automatic replacement and easy servicing of units, plus the fact that the entire expense is tax-deductible. Offsetting these advantages, in the opinion of some, is the lack of choice in some cases of the make of car leased and poor service granted by some organizations.

Drive Their Own—Backbone of company transportation is still the employee-owned car. Forty-seven per cent of firms contacted in one survey report such a setup. Mileage allowances range from 5 to 10 cents a mile, with 45 per cent offering 7 cents.

Employee-owned vehicles are justified, says Dartnell Corp.: 1. When it is desirable to release or conserve management capital. 2. When mileage accumulated yearly is below the point at which company-owned or leased vehicles can be profitably operated. 3. When employee vehicle allowances are in line with the cost of company-owned or leased automobiles. 4. When employees strongly desire car ownership to have a personal car during nonbusiness hours.

Pros and Cons—Employee-ownership also offers the advantages of a minimum of administrative work and permits the employee to drive the car of his choice but has the disadvantage that many a prospective employee cannot afford a suitable car. In addition, employee-ownership may cost up to 24 per cent more than company-owned cars on a mileage basis.

A major factor is that a flat mileage allowance, despite its desirable simplicity, often results in under or overallowances. One answer is a formula developed by the Chicago cost-accounting firm of Runzheimer & Co. It considers costs that are relatively independent of the mileage driven, as well as the flexible costs.

Formula—The fixed allowance covering insurance, license fees and depreciation for a car in the Ford, Chevrolet or Plymouth class is $1.55 for each day it's driven in company service. An additional allowance of 3.5 cents a mile covers gasoline, oil and tires; they vary with mileage to yield a mileage figure close to the company-owned car figure under like conditions.

These alternatives (and others not cited) can keep mileage costs close to the 5.75-cents-a-mile figure and maintain a just relationship with employees to boot. If the mileage covered by your employees annually warrants it, it will pay you to have cost accountants go over your business car expense program and suggest revisions.

For the business car is a major tool of industry.

Next week, the second of this series of two articles, STEEL *will consider the question "Are You Getting The Most Out Of Your Fleet Operation?" Reprints of both articles may be obtained by writing* STEEL, *1213 W. Third St., Cleveland 13, O.*

Types of mileage allowance being used today:

Flat mileage allowance—This form of allowance is most often used. It is simple to understand, involves a minimum of bookkeeping and office control. Disadvantage lies in possible overcompensation or undercompensation in comparison with actual operating costs.

Weekly allowance—If cars are operated constantly on company business a weekly allowance based on mileage driven in varying types of territory has many advantages.

Combination allowance—This form of allowance takes into consideration certain annual fixed costs, which are relatively unaffected by mileage, such as insurance, depreciation and license fees. Expenses that vary directly with the mileage driven, such as gasoline, oil and tires, are also considered.

Runzheimer Formula—Grants an allowance of $1.55 per day for each day that the car is driven on company business, plus a 3½-cents-per-mile allowance for each mile the car is driven on company business.

What does it actually cost to operate a car?

Operating costs decrease per mile as mileage increases annually. Considering a car of the Plymouth, Ford or Chevrolet class based on the Runzheimer formula:

5000 miles at 3.5 cents per mile	$175.00	
365 days at $1.55 per day	$565.75	
		which equals 14.8 cents per mile.
10,000 miles at 3.5 cents per mile	$350.00	
365 days at $1.55 per day	$565.75	
		which equals 9.16 cents per mile.
20,000 miles at 3.5 cents per mile	$700.00	
365 days at $1.55 per day	$565.75	
		which equals 6.33 cents per mile.

Runzheimer recommends a correction factor for mileages over 18,000 not used here.

Defense Plant Building Aided

If you're engaged in defense business and looking for a new plant site, you'll be interested in tax revision announced Oct. 1 by the Office of Defense Mobilization.

Companies that put plants in any area classified by the U. S. Department of Labor as having a substantial labor surplus (Group IV) are given special treatment. They're allowed to write off the portion of total capital investment certified as related to defense production in five years instead of the longer normal Internal Revenue depreciation period. Exact amount of write-off will be individually determined.

This policy is a follow-up of a provision dated in November, 1953, which resulted in building of plants having an estimated value of $167 million. They will result in the direct employment of 8000 workers.

Scaffolding Hits New Heights on Crest of Construction Wave

Continued building makes scaffolding manufacturers hopeful for even better 1955 sales as they discover new and extended applications for their product

SCAFFOLDING sales are on an escalator. They climbed from $3 million a year just before World War II to $10 million in 1951, went up to $15 million last year and are expected to soar even higher this year.

A goodly part of business in scaffolding comes from rents. If this source of income were included in the annual sales figure, it might reach nearly $25 million. One manufacturer estimates more scaffolding is being rented than sold.

Breakdown—Six companies account for most of the volume in steel scaffold manufacture, although there are more than 40 firms in that field. Only two make extensive use of aluminum. Its lightness is an asset in maintenance work, but the product costs a little more than its steel counterpart.

Main type of scaffolding on the market is the tube and clamp variety that can be quickly assembled and dismantled. Another is the frame type; rigid frames about 5 feet wide and from 3 to 10 feet high are shop-fabricated, then bolted together. One manufacturer fabricates a steel frame that can be used for racks, supports, hangers, platforms, bins and shelving, as well as scaffolding.

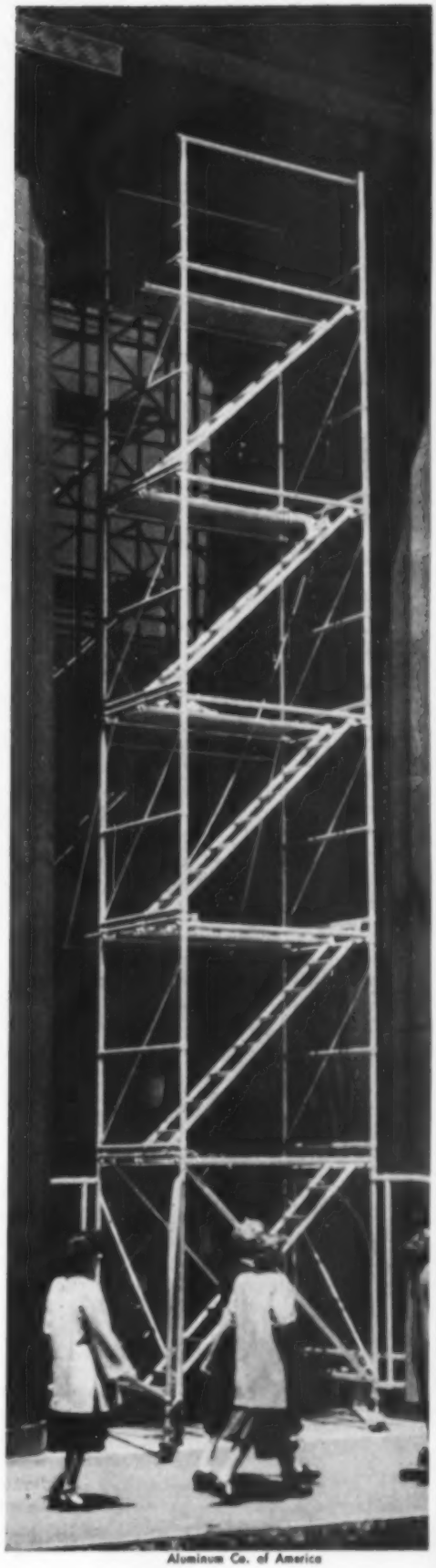
The Market—Construction is scaffolding's biggest consumer. Today, the product is gaining extensive use in shoring up poured concrete buildings. It can be moved from form to form without expensive delay. Universal Mfg. Corp., Zelienople, Pa., has this type mounted on casters for easy moving.

The most spectacular use is for underpinning in the pouring of heavy slabs and beams of concrete. Even a modest shoring job involves hundreds of frames, which, when they are all erected, present quite an impressive sight.

The product, in the form of materials handling equipment, overhead maintenance towers and swinging scaffolds, sees yeoman's service in maintenance work. William Logan, sales engineer at Advance Scaffolding Division, Beaver Art Metal Corp., Ellwood City, Pa., says his company has received inquiries on using scaffolding for playground equipment.

Corn Crib, Yet—Safway Steel Products Inc., Milwaukee, has turned up one of the most novel uses. They are manufacturing a "Scaf-O-Crib" with interchangeable parts. It is said to be "easily assembled by any farmer and his hired man into a temporary corn crib, livestock self-feeder, overflow silo, grain storage bin, portable stock pen, play pen or playhouse and scaffold or work tower." With the framework furnished by Safway, the farmer needs only snow fencing or waterproof paper to complete his crib, silo, etc.

Where is the scaffolding industry going? "Up," say manufacturers. R. L. Carbeau, assistant to the president of Universal Mfg., asserts: "We view the next six months as being fair. All the prospects for continued building look good."



Aluminum Co. of America

By E. C. KREUTZBERG Washington Editor

Industry's air pollution fight includes . . .

Carrying the Battle to Washington

INFORMED businessmen are still sorrowing over at least one 1954 legislative casualty—the air pollution section of the housing bill. Passed by the Senate as Title VIII, it was lost in conference in the House.

Counterattack—As approved by the Senate, the air pollution section authorized the secretary of health, education and welfare to spend up to $5 million a year on research (to be done mainly by contractors) and to loan up to $50 million (on a long-term basis) to companies for the purchase of air pollution prevention and depollution equipment. Research was to include development of new smoke abatement and antipollution equipment.

Sponsor of the measure, Sen. Homer Capehart (Rep., Ind.), would like to bring the matter up again. What it would take to get the measure passed into law, according to Washington reports: Industry backing for an educational job on the Hill.

Dollars and Night Air . . .

Air pollution has been an issue throughout history. The ancients had a "miasmatic" theory that noxious floating material in night air caused pestilential epidemic diseases. Great fires were kept lit at city gates to avoid the supposed evils.

But is wasn't until the 20th century—when air pollution took on the dollar sign—that the problem was attacked in earnest. For example, American Steel & Wire Co. made out-of-court settlements on some 130 damage suits growing out of 22 deaths allegedly caused by smog at Donora, Pa., in October, 1948. Shortly after, more than 100 orchardists and farmers claimed several million dollars damages from Reynolds Metals Co.'s aluminum plant at Troutdale, Ore. Though claims were adjusted, a federal district judge ruled for the plaintiffs.

Today, there is a great deal of activity on the air pollution front in such places as Los Angeles county, Calif., Allegheny county, Pa., and St. Louis, Mo. Individual companies are co-operating, and millions of dollars have been and are being spent on electrostatic precipitators, baghouses, Venturi scrubbers and other equipment. Air pollution campaigns are being conducted right now by McLouth Steel Corp., Fairless Works, Kaiser at Fontana, Westinghouse Air Brake and Duquesne Works, among others.

Still a Problem . . .

Despite the great amount of work being done, only the surface has been scratched.

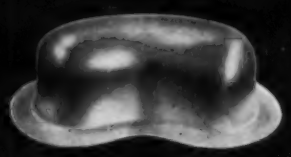
One leading authority, Charles R. Williams, Liberty Mutual Insurance Co., Boston, says that "the question of the role of air pollution in the health of a community is so involved that the job of answering it is almost insurmountable."

Intensive study of the Donora case, for instance, failed to reveal conclusive answers, he says. General conclusion from Donora is that no single polluting agent was present in sufficient quantity to account for the deaths. Apparently, some combination of contaminants was responsible. But even that is mostly guesswork.

How It Can Be Done . . .

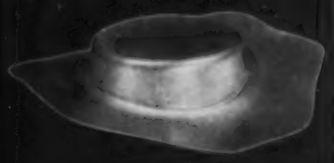
With manufacturers setting a pattern of settling air pollution damage suits out of court and with courts definitely holding manufacturers financially responsible in most cases, the economic hazards are becoming increasingly great. In view of the size and scope of the health problems involved, it is becoming clear that air pollution problems cannot be resolved through the efforts of individual companies or separate industries.

The Capehart idea of a national approach to the problem, financed adequately by public funds, appears to be a better one. It can be put into effect next year if the measure gets the support it merits from industry.



One operation
0.064" 245O Aluminum

One operation
0.051" 245O Aluminum



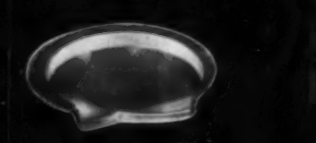
One operation
0.064" 615O Aluminum

Drop Hammer combined with one Hydroform operation.
0.064" 615O Aluminum

One operation
0.040" 755O Aluminum

One operation
0.025" RC70 Titanium

◀CINCINNATI HYDROFORM MACHINES AT NORTH AMERICAN AVIATION, Inc. 26" machine in foreground, 12" machine in background. For a description of the Hydroforming process and specifications of the 8", 12", 19", 23", 26", and 32" machine sizes, write for Bulletin M-1759-3.



One operation
0.051" 615O Aluminum

Two operations
0.040" 615O Aluminum

Two operations
0.032" 525O Aluminum

Three operations
0.032" 615O Aluminum

One operation
0.051" 615O Aluminum

One operation
0.064" 615O Aluminum

CINCINNATI

Hydroform

These are typical aircraft components produced on two *Cincinnati Hydroform* machines at North American Aviation, Inc. Hydroforming has increased their overall production of intricately-shaped parts . . . made from all types of materials ranging from aluminum to titanium . . . at *very substantial savings* in development and production time, in tooling, material and labor costs.

To determine if Hydroforming can produce similar savings for your manufacturing program, call a Cincinnati Milling field engineer.

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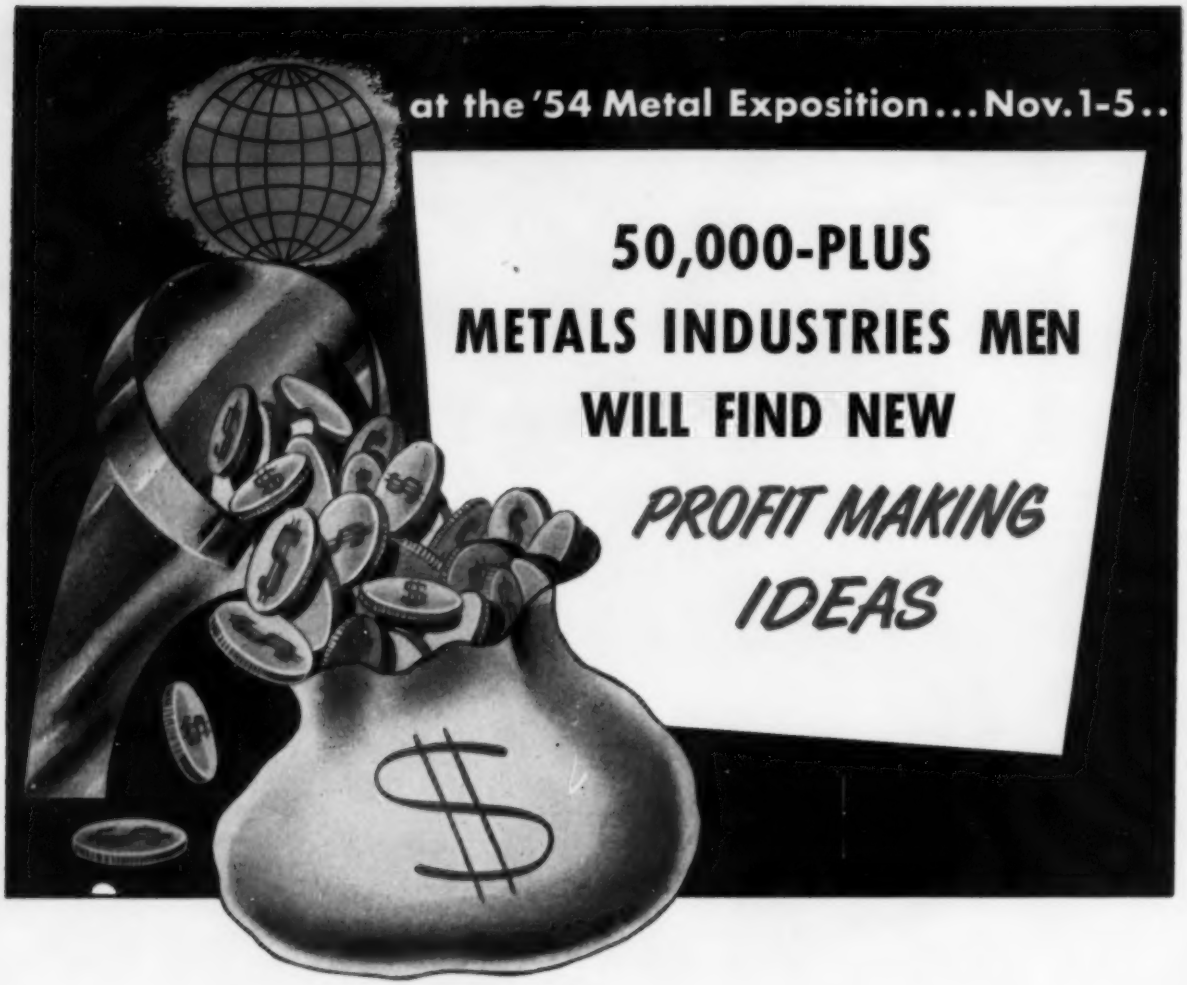

Searching for new product ideas . . . shooting for sharp competitive advantages, this great audience of metals industries men will be checking carefully into everything that's new . . . improved . . . outstanding in the metalworking field. What's more—they'll find what they're looking for—and they'll go away with more profit-making ideas than ever before! That's why today's tough competition demands your presence at the '54 Metal Show—its the one place where industrial profit-making ideas are born!

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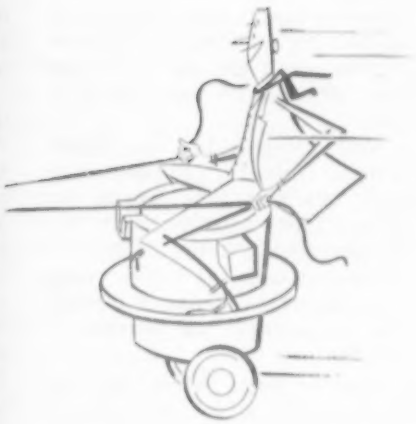

Joel Hunter: Vision Backed with Know-how

FINANCIAL COMPLEXITY of doing business today, a complexity which has grown steadily during the past ten years, has caused industry to become increasingly aware of the importance of top-notch financial thinking in mangagement. As a result, many of the nation's largest industries are now guided by men of financial background and experience. Joel Hunter, recently elected president of Crucible Steel Co. of America, provides an outstanding example.

Although Mr. Hunter's background and experience have been on the financial side of business, he exhibits an intimate knowledge of his company, its products and customer requirements. What's more important, he has a sharp eye on the future.

His Start—Joel Hunter was born in Atlanta in 1905. His father became Georgia's first certified public accountant, and Joel joined his father's firm after being graduated from Emory University. Upon his father's death, he ran the organization until 1942, when it merged with Haskins & Sells. One of Haskins & Sells' clients was, and still is, Crucible.

As a partner in Haskins & Sells, Mr. Hunter devoted a great deal of time to the Crucible account. It was natural that, in the course of his duties, Mr. Hunter would become closely associated with William H. Colvin, Crucible's president (1946-1954). Impressed by his financial ability and forward-looking approach to management's problems, Mr. Colvin convinced Mr. Hunter in 1951 that he should become Crucible's financial vice president. He was elected director and executive vice president in 1953. Last May, upon Mr. Colvin's retirement, Joel Hunter took over the reins, becoming Crucible's top executive. He is also chairman of the board of Vacuum Metals Corp. and a director of Rem-Cru Titanium Inc. and Snyder Mining Co.

His Formula—Mr. Hunter says: "My job is people and plans. The problem is to pick the right people and to stimulate them to carry out plans management has initiated. I try to keep in personal touch with all those in the organization who make decisions."

Every other Monday morning Crucible's department heads meet to dicuss current activities and future plans. These meetings give the president and his associates the opportunity to keep abreast of all company plans and programs.

Setting the Pace—Planning for the future is, as Mr. Hunter puts it, "our big interest. Crucible, as a producer of 'special purpose steels' must be in the vanguard of technological advance. We must be geared to meet the special needs of industry generally and our customers particularly." As examples, he cites Crucible's advances in the fields of titanium and vacuum melting.

Europe's Steel Output Gains

The European Coal & Steel Community has upped its total steel production for the first eight months of 1954. The question is: How long will it last?

CRUDE STEEL output of the European Coal & Steel Community (ECSC) for the first eight months of 1954 was 4 per cent (1,106,000 tons) ahead of the same period in 1953.

West Germany had the largest tonnage increase, 518,000 tons more this year than last in the period under consideration. But percentagewise, Italy's crude steel production took the biggest jump —21 per cent. In terms of tonnage that amounts to an increase of 458,000 tons.

Another large gainer was the Netherlands, up 7.4 per cent for the first eight months of 1954, compared with the first eight months of 1953. In 1952, Dutch steel mills produced only 685,000 tons of crude steel; in 1953, 889,000 tons.

Outlook: Good — Demand in ECSC countries showed no indications of weakening. Belgium, Luxembourg and the Netherlands reported satisfactory demand. Of course, it was better-than-satisfactory in West Germany and Italy. French crude steel production is expected to add up to something less than the top 11-million-ton year of 1952 but still more than 10 million tons again this year.

British Output Up, Too

A quick look across the channel at British steel output shows production bouncing back strongly from the vacation doldrums. Steel output for August was a record for the month with 358,160-tons-a-week average or an annual rate of 18,625,200. British steel capacity has increased over the year but strong demand leaves little doubt that order books will be fat well into first quarter of next year.

Figures issued by the Council of Ironfoundry Associations indicate total output of iron castings in first half, 1954, was 2,081,200 tons or 1.7 per cent above that of the same period in 1953. Foundrymen confidently expect to exceed last year's output of castings in 1954 despite a lull in the light castings trade early this year.

Right now British metalworking industries report near-boom conditions. For example, British auto output is way up; exports are expected to set a record this year. For the first half, 1954, exports amounted to 65,895 units.

Britain's newest export industry, office machinery, sent $22.4 million worth of goods out of the country in the first eight months of 1954. That's $2.8 million more than in the same period of 1953.

Railroad rolling stock producers are working at capacity. Besides the heavy replacement program at home, British producers are working on big orders from Canadian and Brazilian buyers.

Demand pressure for heavy structurals shows no signs of weakening. British building contractors had to postpone many schemes during the period of steel shortages. Now such projects are getting the green light.

Down to the Sea

The 2000-ton tanker, Marie Boettger, passes Frankfurt on the way to the North sea from her site of construction in the interior of Germany. Many ocean-going ships are being built inland where labor is cheaper

Trade Fair Head Named

Roy F. Williams, Boston industrialist, has been appointed by Commerce Secretary Sinclair Weeks to organize the stepped-up program of American participation in international trade fairs. Mr. Williams has been loaned by the Associated Industries of Massachusetts, of which he is executive vice president, to the Commerce department for this assignment.

Says Mr. Williams about the job ahead: "The Commerce department is intent on providing effective support to U. S. business in exhibiting its products at international trade fairs . . . these foreign trade fairs are an integral part of the economic well-being that foreign trade fosters, and they also provide excellent show places for American products and the American way of life."

Money Problems in Germany

There is discontent in Germany regarding the $100-million loan from the U. S. for use by ECSC to modernize its basic industries. Say the Germans: "Most German steel and lignite plants will get nothing in spite of large investment needs." On the other hand, the same Germans are pleased with growing relaxation of vertical combines in the Ruhr. A strong trend toward reintegration of German steel and coal interests is in the making.

Philippine Trade Reviewed

If you have views or information on U. S.-Philippine trade agreements you'd like to present, the deadline for public hearings before the U. S. Delegation for Philippine Trade Negotiations is Oct. 22. The delegation will revise, subject to the approval of the congresses of both countries, the Agreement on Trade and Related Matters of 1946, regulating trade between the two nations. Information on where and how to voice your opinions may be had at any Commerce department field office or by writing to: The Chairman, U. S. Delegation for Philippine Trade Negotiations, State Department, Washington 25.

Sales Figures on Fractional Horsepower Motors, Generators and Motor Generator Sets

	UNITS	DOLLAR VALUE
1954 (1st 6 months)	5,500,000	84,154,000
1953	15,014,000	206,600,000
1952	13,260,000	182,700,000
1951	14,700,000	199,800,000
1950	16,100,000	168,200,000

Source: National Electrical Manufacturers Association.

Fractional Motor Sales Are on Downtrend But Construction Level Sustains Optimism

DEMAND for fractional horsepower motors will be off this year.

But it would be difficult to convince most manufacturers that it will drop sharply. Construction activity is at high levels, and home building, in particular, is setting a near-record pace.

Comparatively Speaking—Optimism for a good year prevails despite a slow start. First-half reports to the National Electrical Manufacturers Association show sales of fractional horsepower motors, generators and motor generator sets at 5.5 million units (valuation $84,154,000), compared with 9.8 million in the corresponding period of 1953, and, as shown in the accompanying table, 15,014,000 units for all of last year (valuation $206,000,000).

Obviously this is a slow start. If the sales rate for the first half were to be maintained for the current half, the total for the whole year would be 11 million units, or down close to 27 per cent from 1953. However, many are convinced that last year's trend will be reversed this year. This school of thought maintains that excess stocks in buyers' hands, represented by motor units and appliances with the units contained, have been largely worked off. So last-half volume will be definitely greater this year than last.

Specially Helpful—High rate of home building is proving to be especially encouraging to fractional horsepower motor manufacturers (of whom, incidentally, there are more than 160, not including makers of toy and clock motors). One large manufacturer estimates that close to 70 per cent of output of fractional horsepower motors goes into home and home-related requirements. If activity in those lines can be sustained at a high rate, demand this year can't be off too much.

Industrial needs for hand tools and light machine tools are less promising. Also, doubt exists whether business machine demands will measure up to last year, although there is currently an upturn in this field. Aircraft requirements are definitely off. But stepped-up defense needs may provide a last-minute stimulant. The Defense department is planning to double over-all procurement expenditures for the current government fiscal year.

A Comer—Potentially, air conditioning requirements are the greatest for any one line. The past season was not quite so active as anticipated due to more moderate temperatures throughout the country generally.

But business was up from the year before and fractional horsepower motor manufacturers believe that this market has scarcely been scratched. Two other lines offer important potentials—the electric sink (dishwashers and garbage disposal units) and clothes driers.

Motor deliveries are easy; raw materials are ample. Imports currently are running less than 1 per cent; exports, mostly components of end-use products, are difficult to gage. Standardization is dormant, at least temporarily.

PRODUCTION PROBLEM?

if you use flat-rolled steel talk to a specialist

PROBLEM With present designs and manufacturing facilities, the auto industry needs wide coils of sheet steel with a minimum number of welds. These welds must be cut out before steel goes into the big presses—a costly, time-consuming process.

SOLUTION As a prime supplier to the automotive and other industries, Great Lakes Steel has developed facilities which now produce wide coils of steel in greater lengths . . . drastically reducing the number of expensive welds in each coil. Result: important fabrication savings for our customers.

MORAL Whether you make autos, appliances, or farm machinery . . . if it's flat-rolled steel, you can't lose by talking to Great Lakes Steel—specialists in flat-rolled production and application for 25 years.

Great Lakes Steel
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UNIT OF NATIONAL STEEL CORPORATION

SALES OFFICES IN NEW YORK, CHICAGO, CLEVELAND, GRAND RAPIDS, LANSING, INDIANAPOLIS AND PHILADELPHIA

Plymouth plant layout revamped preliminary to . . .

Putting All-New Car Into Production

DETROIT

CHANGING over to an all-new car is only somewhat more complicated than building a new plant to do the job in the first place. A new plant layout for the changeover is plagued by understandable but nasty little considerations of "utilizing existing facilities where possible."

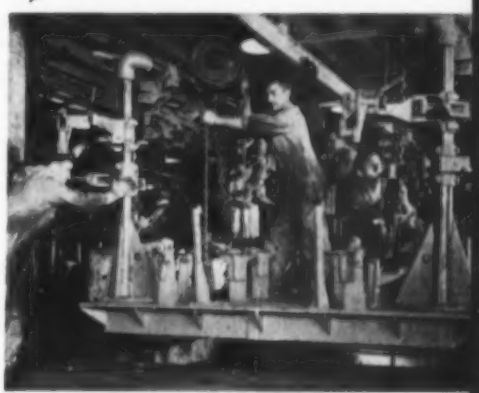
This is the sort of thing that makes industrial engineering a perilous combination of art and science and can lead seasoned engineers to think in terms of skyhooks, rubber walls and assembly line shrinkers.

The Big Shift—To prepare for the 1955 Plymouth body alone, a total of 6103 new welding machines, gun welders, presses, tools and assembly and checking fixtures were installed. There are 27 miles of conveyors in the Plymouth Lynch Road plant, and 6625 new hooks were welded onto the lines to carry the new parts on their way to assembly points. Over 6300 feet of new conveyors were installed, and more than 200 machines were moved. And as a final touch, over 10,000 feet of paint pipes were cleaned to accommodate new colors Plymouth will introduce.

Twenty Months—All this began in February, 1953, when Plymouth's v. p.-manufacturing, Carl Demrick, together with the plant engineer and master mechanic, looked over the body clays of the 1955 design. Working from plastic skins that simulated the parts ultimately to be produced in metal, these men began working on the basis of "here is a new car; what is the best way to build it?"

One little problem lies in the fact that before a part can be tooled an engineering release must be obtained. Some parts are released a year and a half ahead of the time the car is to be built, while others may be released only a month ahead. The reasons—last minute changes on the part of the competitors, an occasional technological bug or a better idea.

Setting the Stage—When parts are released, manufacturing has the job of following the tool releases to make sure the plant gets the tools needed to get the car. The plant engineer takes care of



New equipment put into place

Big press gets final adjustment

plant layout, including materials handling, installation of machines, wiring and paint equipment, to name but a few. The master mechanics work on the equipment needed for assembly and fabrication, including everything from machines to screw drivers.

At Plymouth the plant is divided into six operational areas for planning, which include cast iron, steel machining, motor assembly, sheet metal and paint, body assembly and final assembly. Key men from these groups gather with the process planners in weekly conferences during which they set the stage for refurbishment.

Rehearsal — But that's only a small look at one part of the story. During the actual changeover period, the 450 supervisors stay on the job at Plymouth to learn how to build the new car. Working from operation sheets that detail the steps to be performed, they use prototype parts and become thoroughly acquainted with their role in the production of the new car. As part of the training process, and to be sure the tools operate as expected, Plymouth this year built two complete cars for practice. Then the cars were run through the line backwards and completely disassembled, then back through once more and put back together.

At this point the production people are playing it by ear and plenty of changes are suggested. At Plymouth about five days were consumed in making changes, after which the second rehearsal was held with things expected to be right. Operations were performed just as they would be done by the man on the line, using the actual production equipment and standing in the exact specified location.

Listen to Critics—From this was obtained not only suggestions for improvement, but also supervisors were able to plan their instructions for the foremen who in turn will pass them to the workers under them. That's the principle on which auto assembly is resumed at Plymouth, a pyramid with information spreading out from the few to the many. For that reason as well as to give time for solving problems which continue to arise when the new line goes into operation, the production begins slowly.

An innovation at Plymouth this year is the initiation of production on four-door sedans only. When production people have become familiar with the way each car goes together, other models requiring slightly different procedures will be introduced. At the same time the line speed is gradually being increased from the initial few units an hour to the three cars per minute which the lines are capable of producing.

Also critical at this time is the inspection function to catch any possible errors of man or machine. Engineering test departments dip into early production generously to give the cars a thorough going over despite the fact that each part has been previously tested before it was released to manufacturing. The release of a new model with "bugs" is a terror the automen dread most. Word-of-mouth reports of poor workmanship can kill sales even though the trouble is subsequently corrected.

Output Going Up—One spokesman estimates that the plant will probably be up to full production about the end of October, all this notwithstanding. As the plant hits that production, a number of interesting new pieces of equipment are helping to do the job.

One is a new set of dial-type machines for finishing intake and exhaust manifolds, replacing 61 separate machines which performed such operations as milling, drilling, spot-facing, etc. Another is an automatic welding setup for gas tanks which does the job automatically as the tank is conveyed from loading to unloading points. Strip welders work in pairs to seal the flanges and the tank then drops automatically into a fixture in the water test where it is inspected under pressure for leaks.

Body Longer—Some of the specific problems the plant solved may also prove interesting. Since the body of the new Plymouth is longer than the 1954 job, the body line had to be extended 67 additional feet to handle the number of units desired. Then there was the matter of the V-8 engine.

Received by the assembly plant from Dodge, the engines had to be routed into a transfer area for scheduling into the assembly operation. To get the engines into the plant and get six-cylinder engines manufactured in the plant out, an express conveyor was installed which had to go above all other conveyor systems in the plant. Beam extensions were added on up through the roof of the plant as shown in the photo to do the job. Altogether 7000 feet of conveyor were added just to handle engines.

Supply Lines Refilled — Meantime, of course, the supply lines that had been so painstakingly drained to halt production of 1954 models were just as carefully being refilled. Samples of vendors had been approved beginning early this year, and first production had started on such items as textiles about five months ago.

During this period, the vendor occasionally has production problems of his own, and the auto company, which normally allows a margin of safety in setting its initial delivery dates, begins a series of frantic phone calls to alternative suppliers if the problem looks too hot to handle.

Take this meager glimpse into what it takes to start production, multiply it by the industry and you can see why Detroit has a traditionally warm autumn. The only thing hotter: The models these boys are preparing to produce.

Auto, Truck Output

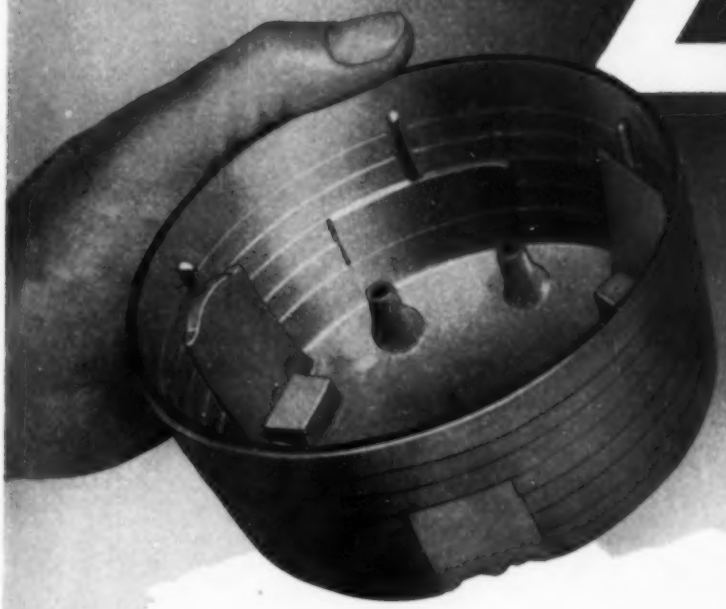
U. S. and Canada

	1954	1953
January	594,789	614,000
February	573,801	628,017
March	672,485	752,149
April	676,233	782,491
May	621,249	684,843
June	623,732	713,778
July	543,534	756,592
August	523,785	640,186
September	365,000*	605,228
October		651,153
November		457,852
December		529,588
Total		7,815,877

Week Ended	1954	1953
Sept. 4	110,995	132,574
Sept. 11	84,556	122,863
Sept. 18	74,026	146,912
Sept. 25	71,017	140,953
Oct. 2	82,817	142,824
Oct. 9	87,500*	148,779

Source: Ward's Automotive Reports.
*Estimated by STEEL.

DIE CAST OF ZINC



for CORY

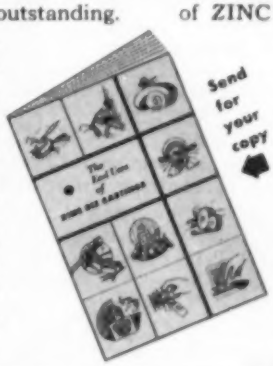
The "innards" of the "Crown Jewel" incorporate mechanical innovations which are claimed to insure retention of the flavor-bearing coffee oils. Its body, spout and cover are gleaming stainless steel, its raffia style handle is heat-proof plastic, and its base, legs and handle holders are ZINC Die Cast.

Here's Why . . . .

In designing the beautiful new "Crown Jewel" automatic electric coffee percolator, the engineers of the Cory Corporation spared nothing in their effort to make this product the finest in its field. And the dual objective of maximum beauty and utility was achieved, in large measure, through the use of six ZINC Die Cast components. Of these, the above base casting is the most outstanding.

This ZINC Die Casting is shown as it is received by Cory from the die caster. The stepped exterior design is clean-cut—with recesses for the legs—and a minimum of preparation is required to coat the as-cast surfaces with a handsome and durable 24-karat gold plate. The interior of this sturdy ZINC Die Casting has a cored center hole and cast bosses and splines which facilitate assembly of the thermostat controls and attachment of the base assembly to the body unit. Furthermore, the Cory name and address and other nameplate data for the percolator are engraved on the bottom of the base in the die casting operation.

The "Crown Jewel" is just one of a great many new products made more salable through the use of ZINC Die Castings. For additional examples ask us—or any die casting company—for a copy of "The End Uses of Zinc Die Castings."



The New Jersey Zinc Company
160 Front St., New York 38, N. Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on
HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

How we opened the door to lower costs for Ford

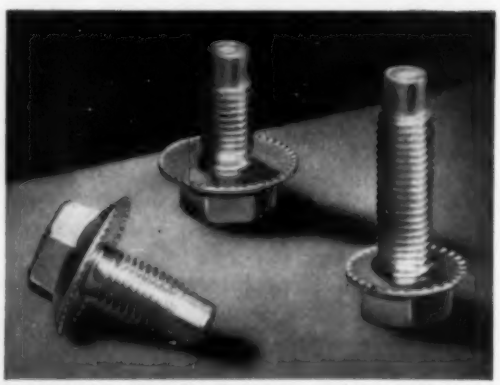
Two hinges on every Ford door. Six screws and 12 washers for each hinge.

Did this present an opportunity for cost reduction? An RB&W "fastener engineer" thought so. And after careful analysis and time studies Ford engineers agreed.

The solution: RB&W Hex SPIN-LOCK screws to fasten the hinge to the door, eliminating the need for washers. And special wide-flange Hex SPIN-LOCK screws for attaching the hinge to the frame, doing away with more washers. The wide flange is necessary to cover an elongated hole in which the hinge moves to permit accurate alignment.

Result — parts requirements are cut by two thirds, assembly is simplified, purchasing and inventory costs are lowered. And RB&W SPIN-LOCK screws hold those door hinges tight for good.

We will be glad to send an RB&W man around to check up on your fastening operations. Every problem is different, of course, but RB&W has a fastener for just about every job. If you need a "special", as Ford did, we'll design and make it for you. Write RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY, Port Chester, New York.



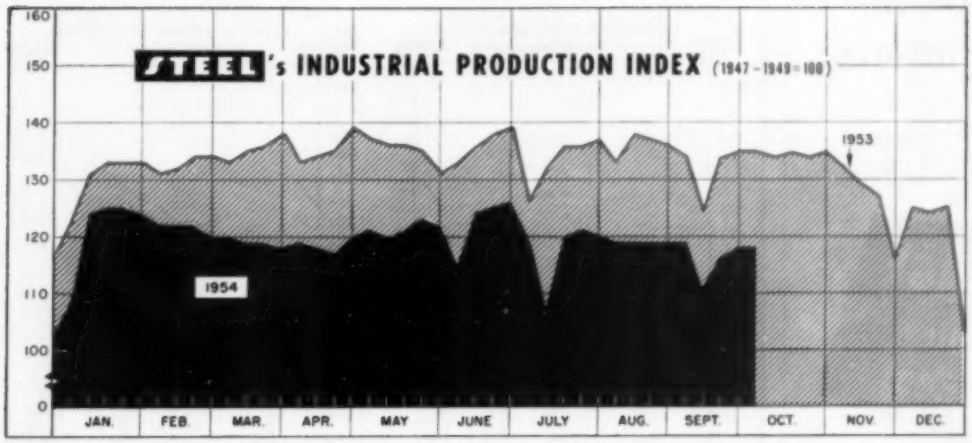
FASTER ASSEMBLY, reduced costs were the pay-off, using RB&W designed wide-flange SPIN-LOCK screws (left) for door hinge. Other SPIN-LOCKS (right) hold hinge on door. SPIN-LOCK screws *can't loosen* because ratchet-like teeth lock into surface and hold tight.

3.10

RB&W

109 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG

Plants at: PORT CHESTER, N.Y.; CORAOPOLIS, PA.; ROCK FALLS, ILL.; LOS ANGELES, CALIF. *Additional sales offices at:* ARDMORE (PHILA.), PA.; PITTSBURGH; DETROIT; CHICAGO; DALLAS; SAN FRANCISCO. *Sales agents at:* PORTLAND, SEATTLE. *Distributors from coast to coast.*



LATEST WEEK*	118
PREVIOUS WEEK	118
MONTH AGO	119
YEAR AGO	135

* Week ended Oct. 2.

Based upon and weighted as follows: Steel Output 35%; Electric Power Output 32%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 11%.

Accelerating Auto Output Speeds Business Upturn

FOLLOWERS of STEEL's industrial production index may wonder why it hasn't started upward with the present business upturn.

There are lots of reasons why it should be going up. Steel production is around 70 per cent of capacity for the first time since late June when the index hit the year's high point. Electrical output is at peak levels, and freight car loadings for revenue are just about as high as they have been all year.

The Anchor—The bogeyman is, of course, auto production. Early and extended shutdowns for model changeover have taken their toll on the index. Car outturn is running just a little over half of what it was when the index hit its high for this year.

But higher production is on the way. The week ended Sept. 25 with 71,017 auto and truck completions is probably the low point of 1954. Recovery is already noted in the week ended Oct. 2 when 82,817 vehicles rolled off the lines in U. S. and Canada, according to *Ward's Automotive Report.*

Climb Ahead—It will still be another month before production is really humming, though. By that time most of the major automakers will have changeover completed. Many will be on accelerated production schedules in the last months of the year.

All Chrysler Corp. divisions are at work on '55s. So are Chevrolet and Pontiac. Other makes will change over from now till year end.

Among the first to go on record concerning the auto sales outlook for 1955 is Joseph E. Bayne, sales manager of Lincoln-Mercury Division. Mr. Bayne sees total sales of "5.3 million units in the year."

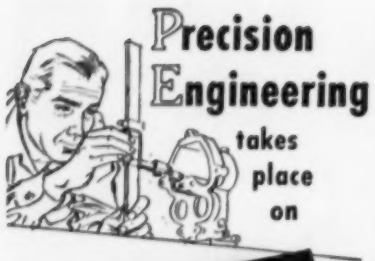
"Competition will be more keen than at any time since the end of World War II," he notes, stressing the growing importance of strong dealer organizations with the ability to sell aggressively.

Up the Ladder—The steel situation looks good. Many people

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,678	1,678	2,146
Electric Power Distributed (million kwhr)	9,030[1]	9,072	8,414
Bitum. Coal Output (daily av.—1000 tons)	1,346	1,155	1,610
Petroleum Production (daily av.—1000 bbl)	6,154[1]	6,183	6,443
Construction Volume (ENR—millions)	$233.9	$340.9	$341.2
Automobile, Truck Output (Ward's—units)	82,817	72,804	142,824
TRADE			
Freight Car Loadings (unit—1000 cars)	685[1]	710	813
Business Failures (Dun & Bradstreet, no.)	192	212	189
Currency in Circulation (millions)[3]	$29,922	$29,888	$30,271
Dept. Store Sales (changes from year ago)[3]	+3%	0%	+3%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$18,112	$20,262	$18,087
Federal Gross Debt (billions)	$274.7	$274.7	$273.0
Bond Volume, NYSE (millions)	$14.8	$15.4	$13.3
Stocks Sales, NYSE (thousands of shares)	9,494	10,773	5,106
Loans and Investments (billions)[4]	$83.0	$83.1	$78.9
U. S. Gov't. Obligations Held (billions)[4]	$35.9	$35.8	$31.4
PRICES			
STEEL's Finished Steel Price Index[5]	194.19	194.19	189.38
STEEL's Nonferrous Metal Price Index[6]	218.2	218.3	204.8
All Commodities[7]	109.7	109.2	110.7
Commodities Other Than Farm & Foods[7]	114.5	114.4	114.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1954, 2,384,549. 1953, 2,254,459. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.



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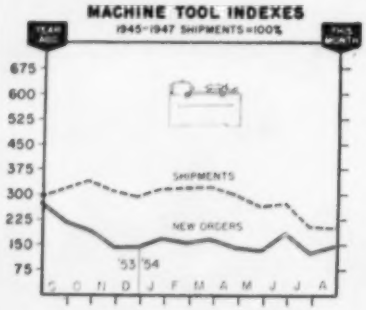
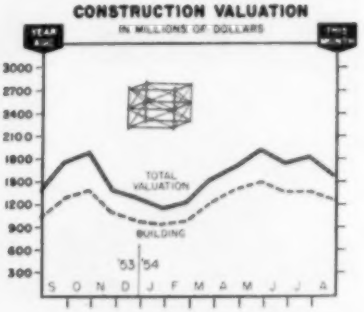
THE BUSINESS TREND





	New Orders		Shipments	
	1954	1953	1954	1953
Jan.	173.5	255.8	319.4	361.6
Feb.	159.8	282.1	323.1	354.5
Mar.	169.6	327.0	327.2	375.9
Apr.	142.8	276.8	302.7	372.7
May	139.5	246.4	270.3	356.0
June	145.2	273.4	276.3	342.2
July	124.7	247.3	205.7	267.6
Aug.	147.0*	246.9	202.9	299.6
Sept.	....	223.7	....	325.3
Oct.	....	198.7	....	318.4
Nov.	....	146.6	....	320.2
Dec.	....	149.8	....	301.4

* Preliminary
National Machine Tool Builders' Assn.

Charts copyright 1954 STEEL.

37 States

	Total		Building	
	1954	1953	1954	1953
Jan.	1,151.9	1,075.9	935.6	876.0
Feb.	1,221.3	1,021.3	977.5	792.9
Mar.	1,527.5	1,374.5	1,199.8	1,054.4
Apr.	1,691.9	1,741.5	1,401.6	1,354.2
May	1,925.3	1,606.1	1,497.6	1,219.8
June	1,733.3	1,115.5	1,376.7	922.3
July	1,836.9	1,793.3	1,346.9	1,417.8
Aug.	1,572.9	1,414.4	1,243.3	1,053.4
Sept.	.....	1,741.7	.....	1,280.7
Oct.	.....	1,892.4	.....	1,392.7
Nov.	.....	1,394.1	.....	1,096.0
Dec.	.....	1,279.8	.....	973.8
Total	.....	17,423.5	.....	13,465.0

F. W. Dodge Corp.

didn't expect the operating rate to hit 70 per cent for another month. But it's right around there now. Odds are that it will continue slowly upward.

Steel companies are lighting more furnaces, getting ready for the looked-for increase in orders. In some cases the orders are already on hand. As auto production gets moving, steelmen will have a better idea of where they stand. Chances are, they'll make out right well.

Record Coming—This reviving activity means continued high demand for electricity. Shorter days and night shifts will help swell consumption. A new record in weekly output is in the offing.

No Silver Lining, Yet . . .

Not likely to set any records, but showing signs of recovery, are freight car loadings. They have been over the 700,000 mark for two weeks in a row and bid to steady at about that mark. It's not likely that they'll see an 800,000-loadings week this year. That point was seldom hit in 1953, though it was the rule rather than the exception this time in 1952.

The 13 regional Shippers Advisory Boards of the Association of American Railroads estimate that loadings of 32 principal commodities will be 8.6 per cent under last year's fourth-quarter loadings of 7,132,329 cars. It's pretty much an across-the-board drop but is specially noticeable in ore and concentrates (down 36.7 per cent), iron and steel (down 14.9 per cent) and coal and coke (down 12.1 per cent).

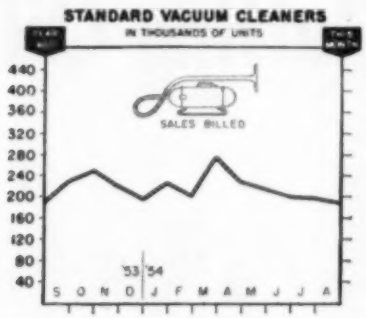
The only metalworking category for which an increase is predicted is autos and trucks (up 8.6 per cent). Machinery and boilers, vehicle parts and agricultural implement shipments are expected to be down.

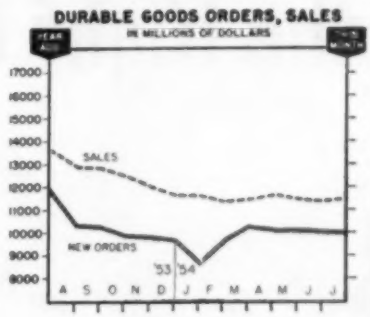
At the beginning of the third quarter, predictions were also for an 8.6-per-cent decrease from 1953. Actually, the drop was somewhat greater. This quarter, though, it looks like the estimates will be close—and may be even on the pessimistic side.

Rail Slump Hits Suppliers . . .

All this brings little consolation to railroad suppliers. Railroad spending is off about one-third from last year as it is—prospects for next year aren't too much better.

Estimated net income of 130





Sales Billed—Units

	1954	1953	1952
Jan.	221,233	255,856	223,357
Feb.	199,035	216,007	230,226
Mar.	276,464	329,294	290,092
Apr.	220,849	285,548	217,169
May	209,434	252,404	216,969
June	195,781	197,506	206,939
July	193,607	159,446	188,715
Aug.	185,397	188,536	222,413
Sept.	.....	227,253	237,541
Oct.	.....	249,383	292,474
Nov.	.....	216,227	254,297
Dec.	.....	190,773	249,032
Total	.....	2,781,263	2,841,803

Vacuum Cleaner Mfrs. Assn.

In Millions of Dollars*

	New Orders		Sales	
	1954	1953	1954	1953
Jan. ..	8,475	12,454	11,580	12,508
Feb. ..	9,629	12,416	11,278	12,666
Mar. ..	10,206	12,520	11,385	13,116
Apr. ..	10,021	12,702	11,502	13,398
May ..	10,050	13,101	11,344	13,148
June ..	9,985	12,342	11,345	13,166
July ..	9,763	11,600	11,456	13,410
Aug. ..	.....	10,139	.....	12,730
Sept. ..	.....	10,110	.....	12,648
Oct. ..	.....	9,677	.....	12,376
Nov. ..	.....	9,631	.....	11,867
Dec. ..	.....	9,567	.....	11,576

*Seasonally adjusted, U. S. Bureau of Business Economics.

Class I railroads in August amounted to $64 million, compared to $81 million in the same month a year ago, says AAR. For the first eight months of 1954, income was off $234 million from 1953.

Operating revenues were off 13 per cent, almost $1 billion. Operating expenses declined only 8.8 per cent, less than $500 million, in the same time.

During the eight-month period, 33 Class I roads failed to earn interest and rentals.

Building Drops Off . . .

Construction went into a temporary slide during the week ended Sept. 30 with contract awards down to $234 million, according to *Engineering News-Record*. Private building slumped most; state and municipal volume was also down. For the first 39 weeks of 1954, construction is down 5 per cent from 1953. A 20-per-cent drop in federal awards accounts for most of the fall.

Building costs, though, are on the rise. Widespread price hikes in cement and higher basic tonnage rates on structural shapes are two reasons, says Austin Co., Cleveland. But George A. Bryant, president of the engineering and construction firm, points out that construction equipment builders have been able to hold the price line in spite of recent increases in wages and material costs. How did they do it? Plant modernization, says Mr. Bryant.

Austin's price index for third quarter is 191, up a point from the previous quarter and up 2 points from a year ago (1926 = 100).

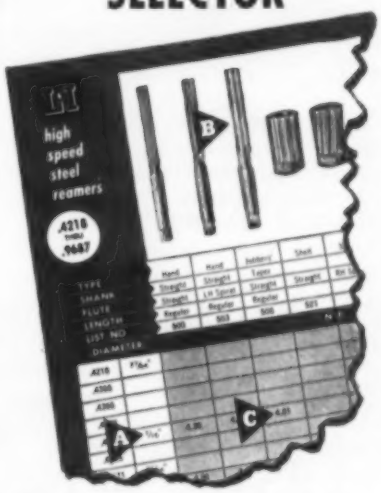
Trends Fore and Aft . . .

Retailers are already rubbing their hands about a coming Christmas season that may be the biggest ever. That means December sales of close to $17 billion. The record, set in 1952, is $16.9 billion. . . . One of Admiral Corp.'s new 21-in. TV sets will give the buyer 270 square in. of viewing surface for about 56 cents a square in. Admiral's first model in 1947, a 10-in. job, cost the buyer $6.73 a square in. . . . Consumer credit is still going up. . . . Nondurable goods, generally only little hurt by the business slump, have been outgaining durables during recovery. . . . Insured unemployment is going down. Metalworking is breaking about even with gains balancing off losses.

Pricing Quality Reamers by Size and Type

is easy as **A B C** with the exclusive new

COMPARATIVE NET PRICE SELECTOR



Now for the first time you can **A** pick the size reamer you want from L&I's long list of standards, **B** select the type best suited for your job, and **C** find the **NET** price quickly and easily. And every reamer is available **FROM STOCK.**

L&I's complete line of Quality Reamers makes it your No. 1 source for all reamer needs.

L&I

Write for this boon for Buyers and Users.

LAVALLEE & IDE, INC.
CHICOPEE, MASS.

Please send me your new Comparative Net Price Selector.

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3

How to Pick the Right Cutting Oil

WORD OF MOUTH?
It gives you the answer sometimes, but not many of your friends have the same cutting oil requirements and the same problems that you have. It's much surer to depend on specialists like Sun.

LABORATORY ANALYSIS?
Sure. But there's no formula for correlating the laboratory analysis with how well the cutting oil will work on your job. It takes years of field experience like Sun's to help you make the right choice.

ELABORATE SHOP TEST?
This will probably give you the answer. But it's expensive and interferes with production when you try to test all the oils available. Sun's experience can help keep your shop-testing to a minimum.

EXPERIENCE IS THE ANSWER.
And Sun has it. Its field representatives have probably come across problems similar to yours many times. If they haven't, its cutting oil specialists and metallurgical technicians are ready to help with your problem.

Soluble or straight, transparent or black, light or heavy duty — Sun makes the kind of cutting oil you need to handle your job at the lowest cost. For more information, call your nearest Sun office or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-10.

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

SUNOCO

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Refiners of famous High-Test Blue Sunoco Gasoline

A. B. DRASTRUP
. . . heads A. M. Byers Co.

HARLAN B. BARTLETT
. . . heads Parish Pressed Steel

F. A. HENRY
. . . A. O. Smith West Coast mgr.

A. B. Drastrup was elected president, **A. M. Byers Co.**, Pittsburgh. He succeeds **L. F. Rains**, retired. Mr. Drastrup has been executive vice president since February, 1954. He became manager of steel sales in 1946 and assistant to the president in 1951.

F. Steele Blackall III was elected a vice president of **Taft-Peirce Mfg. Co.**, Woonsocket, R. I. He is also assistant treasurer and a director.

Joseph J. Swigart was named general manager, **Vitro Rare Metals Co.**, Canonsburg, Pa., division of Vitro Corp. of America. He replaces **Franklin H. Bivins**, who becomes assistant to the executive vice president.

Glen C. Flumerfelt was appointed regional manager for **All-State Welding Alloys Co. Inc.**, at Oakland, Calif., to cover western U. S. and Hawaii.

B. D. Claffey, former president of Acme Aluminum Alloys Inc., was appointed general manager of **Dayton Malleable Iron Co.'s** Ohio Malleable Division, Columbus, O.

Stanley L. Haines was made director of industrial engineering, **American Locomotive Co.**, at Schenectady, N. Y. Mr. Haines joined Alco in 1951 as chief industrial engineer, ordnance division.

Harlan B. Bartlett was named executive head of **Parish Pressed Steel Co.**, Reading, Pa. As executive vice president, he assumes management responsibilities of **Howard S. Lewis**, president, who has retired. Since Sept. 1, Parish has been operating as a division of Dana Corp. rather than a wholly owned subsidiary. Purchasing, sales and engineering continue under Parish control.

E. V. Rohr, formerly with Barth Corp., was appointed vice president in charge of sales and engineering at **Ohio Fabricators Co.**, Coshocton, O. **Norbert W. White**, formerly with Pyle National Co., joins the company as process engineer.

Durant International Corp., Williamstown, N. J., elected **William R. Funk** president. He also is sales manager, a position he has held for the last three years.

William D. Mathers was named assistant manager of forging sales, **Aluminum Co. of America.** He has headquarters in the Cleveland plant.

R. W. Brown, vice president-treasurer, was named executive vice president of **Sharon Tube Co.**, Sharon, Pa.

Ray L. Reedy was elected vice president-sales, **Trinity Steel Co.**, Dallas.

F. A. Henry, former assistant to the general manager, **A. O. Smith Corp.**, Milwaukee, was appointed general manager of the corporation's Pacific Coast works at Los Angeles. He succeeds **A. W. Shuman**, resigned.

Andrew M. Toft and **Allen C. Staley** were elected executive vice presidents of **National Can Corp.**, Chicago. Mr. Toft was a vice president. Mr. Staley was formerly with American Can Co.

Herman J. Tonn, a founder, vice president and first superintendent, **Chicago Rivet & Machine Co.**, Bellwood, Ill., has retired as superintendent. He will devote his time to research and development. **Anton Joncha** was made superintendent; **William O. Shinefluq**, sales manager; **Paul J. Masek**, sales engineer; and **Robert J. Schumann**, assistant superintendent.

Buck Rogers joined **Perfection Industries Inc.**, Detroit, as general sales promotion manager and advertising director. He served in similar positions with Royal Oak Heat Treat Inc.

Walter E. Max was appointed general superintendent of **Worthington Corp.'s** Buffalo works. He is replaced in his former position as manager of the Buffalo service and erection department by **Harry P. Yount**. **John H. Hoefner** is as-

WALTER J. JONES
. . . Chrysler West Coast mgr.

CHARLES E. VANDERPOOL
. . . Rotor Tool sales mgr.

FELIX SWEENEY
. . . Wayne Crane Div. sales mgr.

sistant manager. **George L. Ziegler** was made manager-parts service at Harrison, N. J.

Walter J. Jones was made operating manager of **Chrysler Corp.'s** San Leandro, Calif., plant. **John J. Grant** is manager of industrial relations, defense operations division, Detroit.

Ralph L. Palmer was made director of engineering for **International Business Machines Corp.**, New York. He was manager of the engineering laboratory, Poughkeepsie, N. Y. **John C. Abrams** was made director of laboratory operations; **Jerrier A. Haddad**, director of advanced machine development; and **James J. Troy**, director of product design. **Horace S. Beattie** is manager of the Poughkeepsie laboratory. **Francis E. Hamilton** is manager of the Endicott, N. Y., laboratory.

Barry Corp., Watertown, Mass., appointed **Harold Wrigley** works manager and **Charles S. Basney** new products manager.

H. Webster Crum was made vice president - general sales manager, **Lycoming Division**, Avco Mfg. Corp., Stratford, Conn.

Charles E. Vanderpool was promoted to sales manager, **Rotor Tool Co.**, Cleveland. He joined the company in 1947 as sales promotion and advertising manager. Before that he was sales manager of Cleveland Pneumatic Tool Co.

Lukens Steel Co., Coatesville, Pa., has named **W. Harrison Lackey** manager of field sales. He was manager of plate sales. **Charles A. Carlson Jr.** advances to manager, carbon plate sales; **Robert L. Cahoon** to manager, alloy plate sales.

In the Cincinnati plant of **Trailmobile Inc.**, **Donovan Joslin** was made plant manager and **John J. Mede** was placed in charge of plastics development and application.

Felix Sweeney was made sales manager, **Wayne Crane Division**, American Steel Dredge Co. Inc., Ft. Wayne, Ind. He was eastern district sales representative.

Farrel-Birmingham Co. Inc., Ansonia, Conn., promoted **Philip H. Dreissigacker** to assistant chief engineer. He was division engineer of the sugar mill machinery division.

William E. Litterer resigned as superintendent, heat treating department, Philadelphia Gear Works, to join **Electric Steel Treating Co.**, Bordentown, N. J., as plant manager.

Joe McKellar was named manager of the newly formed light metals division of **McCulloch Motors Corp.**, Los Angeles.

James M. Molpus was made general manager of the Texas division of **R. G. LeTourneau Inc.**, Longview, Tex. He replaces **Harry S. Clark** who was named general manager of a new steel products division. **Ben W. LeTourneau** replaces Mr. Molpus as general manager at Vicksburg, Miss.

W. P. Woodside Jr. was elected president of **Park Chemical Co.**, Detroit.

John H. Harmon Jr. becomes general purchasing agent of **Pure Oil Co.**, Chicago, to succeed **G. L. Parsons**, who after 30 years in the post, becomes purchasing agent emeritus.

Harold J. Chase was made engineering manager of **General Electric Co.'s** small turbine and supercharger department at Fitchburg, Mass.

Cleveland Frog & Crossing Co., Cleveland, appointed **W. C. Wallace** purchaser to succeed **Harry G. Bechhold**, retired. **Virginia H. Rooke** becomes office manager and assistant treasurer, succeeding **Harry C. Engert**, also retired.

Milton R. Vipond resigned as vice president in charge of sales and engineering of Ohio Piston Co. to form **Berea-Vipond Co.**, Berea, O., a sales and engineering firm serving the industrial and automotive manufacturing fields.

John R. Morrow joined **Kaydon Engineering Corp.**, Muskegon, Mich., as assistant sales manager, needle roller division.

John Schippers was made manager of the Chicago branch office of **Colson Corp.** He was Chicago manager for Service Caster &

Clark puts the driver where he belongs

. . . on the new

ELECTRIC TOWING TRACTOR

Clark's new electric towing tractor, rated up to 3000 lbs. breakaway drawbar pull, is the first *true* tractor-type electric machine on the market. The driver sits where he belongs—at the rear of the tractor, within arm's reach of the coupler. He does not have to get off the tractor to couple onto a load. He does not have to jockey around to get in position to hook-up, because he can see the coupler from his seat. This means time savings and energy savings (for both driver and batteries).

Another advantage of this basic design is the well balanced distribution of battery weight for both maximum driving and steering traction. Regardless of steep ramps or heavy pulls, there is no "bucking" with the maximum battery weight positioned within the wheelbase. And like Clark electric lift trucks, the new tractor is designed to work a longer cycle without recharging batteries—the maximum in battery efficiency.

- Easy on-and-off access
- Finger-tip direction control
- Rigid box-type frame: Heavy integral welded plates provide strength for bumping, pushing or pulling.
- Four speeds forward and reverse
- Four coupler types available
- Straight series wound motor: develops comparatively large increases in torque with only moderate increase in current draw; 36 to 48 volts; sealed-for-life bearings.
- Parts interchangeability: Many components are common to the Clark line of electric lift trucks.

For details, contact your local Clark dealer, listed under "Trucks, Industrial" in the Yellow Pages. Or write us direct for specifications.

CLARK EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 26, Michigan

HENRY A. HOLBERSON
. . . Youngstown Metal Products v. p.

JOHN H. SCHUL
. . . director of material at Coleman

CHARLES W. SAWHILL
. . . Aero-Coupling gen. sales mgr.

Truck Corp., recently acquired by Colson.

Henry A. Holberson was elected vice president and general manager, **Youngstown Metal Products Co.**, Youngstown, a subsidiary of Youngstown Sheet & Tube Co. He succeeds the late **David W. Thomas.**

Frederick W. Toohey was made Chicago office manager for **Luria Bros. & Co. Inc.**

Charles S. McIntyre was elected an executive vice president, **Monroe Auto Equipment Co.**, Monroe, Mich.

Reorganization of the manufacturing division of **Coleman Co. Inc.**, Wichita, Kans., advances **John H. Schul** from general purchasing agent to the newly created post of director of material. **A. F. Easley**, assistant purchasing agent, moves to production control manager. **Wilbur R. Oehlert**, formerly assistant to Mr. Schul, becomes purchasing agent.

Erie Foundry Co., Erie, Pa., appointed **Carl Hammon** manager of its hydraulic press division.

Matt Conley is district manager at Milwaukee for **Timken Roller Bearing Co.'s** steel and tube division.

Aeroquip Corp. appointed **Charles W. Sawhill** general sales manager of its West Coast subsidiary, **Aero-Coupling Corp.**, Burbank, Calif. He was industrial sales manager of Aero-Coupling. While with Douglas Aircraft Co. for several years, he helped develop the DC-4 and DC-6.

Ric-Wil Co., Barberton, O., appointed **William F. Wood** general sales manager.

C. J. Mayo was made general sales manager, **Insul-8-Corp.**, Burlingame, Calif. In recent years he has been in charge of western Trambeam sales for Whiting Corp.

OBITUARIES . . .

Clifford L. Wheeler, 51, manager of the magnesium foundry, aircraft engine division, **Ford Motor Co.**, Chicago, died Sept. 15.

William W. Sloane, 68, vice president, **Goodman Mfg. Co.**, Chicago, died Sept. 8.

Martin T. Lynn, vice president and treasurer, **Waterbury Buckle Co.**, Waterbury, Conn., died Sept. 27.

Frank A. Ladish, 76, a vice president of **Ladish Co.**, Milwaukee, for 40 years, died Sept. 6.

Albert J. Anselm, 71, retired vice president - production, **Fansteel Metallurgical Corp.**, Chicago, died Sept. 23.

Arthur T. McWane, who retired in June as president, **McWane Cast Iron Pipe Co.**, Birmingham, died Sept. 27. He was chairman of the finance committee.

Herbert Markle, 50, district manager for **Interior Steel Equipment Co.**, Dayton, O., died Sept. 21.

J. Hunter Nead, former manager of metallurgy and inspection at **Inland Steel Co.**, Chicago, and since 1952 metallurgical consultant to the president, died Sept. 13.

Edward O. Seits, 54, manufacturing executive assistant at **North American Aviation Inc.**, died Sept. 14 in Los Angeles.

Allen G. Butler, 57, vice president and general manager, controls division, **Perfex Corp.**, Milwaukee, died Sept. 6.

Gerard M. Freeman, 37, vice president, **Supreme Products Inc.**, Chicago, died Sept. 23.

R. N. Trane, 67, former president and board chairman of **Trane Co.**, Milwaukee, died Sept. 5.

James Hoy, 78, operator, **Elmira Boiler & Iron Works**, Elmira, N. Y., died Sept. 24.

Daniel S. Eipper, 62, chief design engineer, **Moline Tool Co.**, Moline, Ill., died Sept. 21.

Charles S. Doran, 80, former president, **Sperry Gyroscope Co. Inc.**, New York, and retired chairman of Control Instrument Co., died Sept. 28.

LESS THAN 23 CENTS PER HOUR

will put this new 3-hp, No. 2, Model CHL plain milling machine to work in your plant with

Kearney & Trecker's

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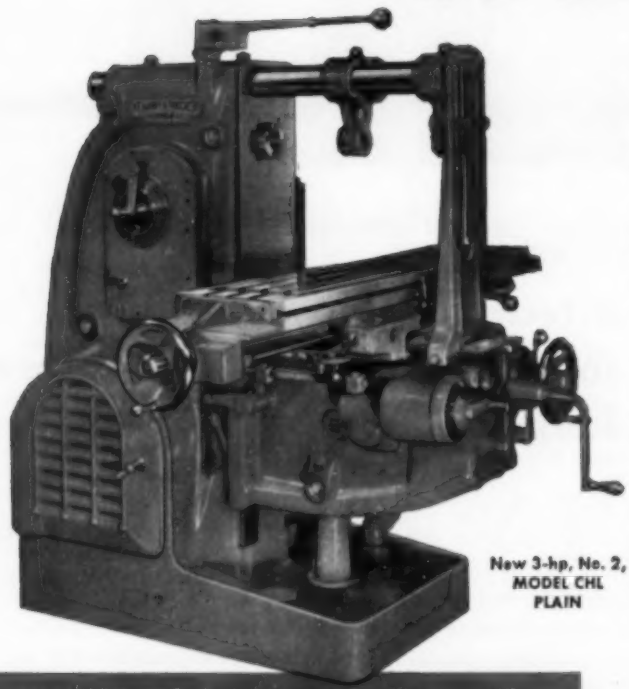
PROGRAM



New 3-hp, No. 2, MODEL CHL PLAIN

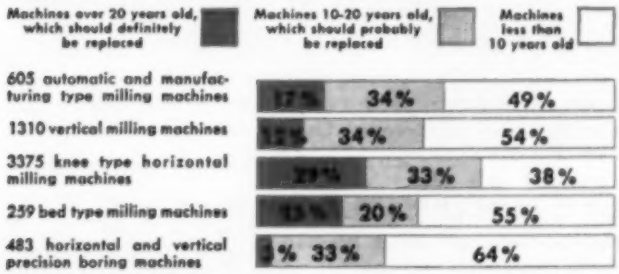
NO! We didn't make a mistake. Under Tool-Lease Plan "A", one of three seven-year lease agreements offered by Kearney & Trecker, you are asked to make two semi-annual rental payments, totaling 25% of the machine's price during each of the first three years. Actually, in dollars and cents, you are asked to invest approximately 23 cents per hour for a new 3-hp, No. 2, Model CHL plain milling machine. That means a machine installed in your plant and in operation — for pennies an hour!

What's more, under Tool-Lease, you can rent any of over 250 standard milling machines or precision boring machines. All are available under three basic plans, with varying options to continue or terminate the lease, or to purchase the equipment. If you require special machinery or heavy-duty CSM bed types, special agreements will be considered.

For complete information on Tool-Lease, see your Kearney & Trecker representative, or mail coupon to Kearney & Trecker Corp., 6784 W. National Avenue, Milwaukee 14, Wisconsin.

MACHINE TOOL OBSOLESCENCE IS BECOMING CRITICAL! WHERE DO YOU STAND?

Here's the picture in a typical industry — GENERAL INDUSTRIAL EQUIPMENT — (see chart below). Of the 6032 standard knee type horizontal, vertical, bed and manufacturing type milling machines and precision boring machines in use today — which can be replaced by Tool-Lease equipment — 22% are more than 20 years old, 33% are 10 to 20 years old, 55% are more than 10 years old!



Figures adapted from 1953 American Machinist survey of metalworking industry

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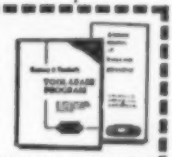

Name.....

Title.....

Company.....

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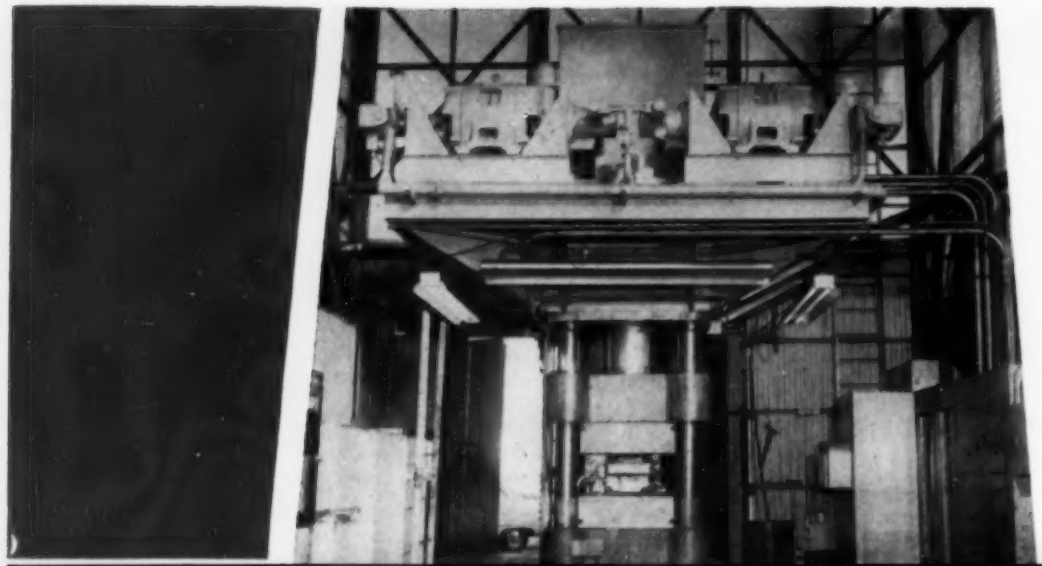
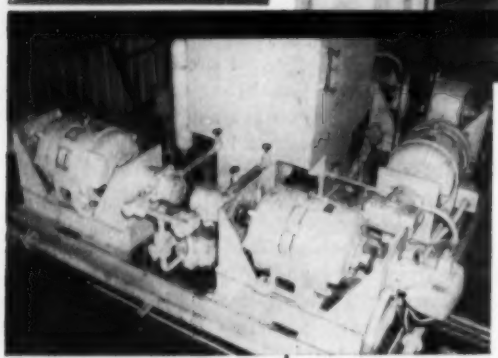
City..... Zone..... State.....





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5,000,000 POUNDS OF CONTROLLED PRESSURE

Choosing the correct motor specification from the wide line of Century types—sizes—torques—speeds—frame protection—adaptability of mounting—results in job matched, Performance Rated, motors.

Century Motors are widely known for their rugged precision construction, quiet starting and running and their unusual freedom from vibration.

Century Performance Rated Motors are available to you because of the wide range of specifications from which to choose. Century Motors are offered in A. C. or D.C.—1/8 to 400 H. P.—constant speed or speed control in fine steps. Drip Proof—Splash Proof—Dust Proof—or Explosion Proof frames.

Specify Century C MOTORS

Century *Performance Rated* Motors on your new equipment. **Call a Century District Sales Office or your nearest Century Authorized Distributor.**

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OFFICES AND STOCK POINTS IN PRINCIPAL CITIES

CE-847

Armco Installs Furnaces

Addition of 12 coil annealing units is part of $1,750,000 project at Middletown

ARMCO STEEL CORP., Middletown, O., has completed a $1,750,000 project at the East Side Works of its Middletown Division. It includes 12 additional coil annealing furnaces and a building to house them. The annealing department is now one of the newest and most modern in the steel industry.

The new facilities are part of the "balancing out" program that Armco has had under way since the construction of three new open-hearth furnaces and a blast furnace.

Improved Product—The new furnaces are designed to provide the carefully controlled heat treating required for modern high-grade sheet steel.

The annealing furnaces are of the single-stack, convector type and will anneal 75 tons of coiled steel per charge. The 12 furnaces will operate on 36 bases, allowing ample time for preparing new charges and controlled cooling. Monthly capacity of the new department is 12,500 tons.

The furnaces will burn coke oven gas from Armco's ovens at Middletown and Hamilton, O. Controls are housed in an air-conditioned room, where constant temperature and humidity will insure precise functioning of the instruments.

The new building has a unique air cooling installation. Large fans bring in outside air, which is first filtered, then blown upward through trenches in the floor and finally allowed to escape at the top of the building. The system provides comfortable working conditions and permits fans in the furnace bases to operate under extremely high temperatures.

Next to the furnace building, another new building provides cooling space and storage area for annealed coils.

Ohrstrom Buys Hammond Mfg.

G. L. Ohrstrom Associates, Los Angeles, acquired the working assets of Hammond Mfg. Corp., Pasadena, Calif. Last January, the same group acquired Consolidated Tool & Products Co., which now will be merged with and operated as Hammond Mfg. Corp. The combined properties will continue to manufacture a line of ground handling equipment for the aviation industry, including guided missiles.

Interstate Steel Expands

Interstate Steel Co., Evanston, Ill., completed construction of a $250,000 addition to its home office and warehouse. Facilities include four overhead cranes of 5 and 10 tons capacity, six depressed truck bays, rail siding inside the building for three railroad cars, slitting capacity to 10 gage and shears that cut plate up to ⅜-in. thickness.

Gearmaker Opens Branch

Falk Corp., Milwaukee, gear manufacturer, is opening a district office in Birmingham under the management of E. W. Hawkins Jr.

Bronze Foundry To Build

Birmingham Bronze Foundries, a licensee of Down River Castings Co., Rockwood, Mich., will build a plant in Birmingham. Products will include heavy industrial gears, steel mill slippers, guide bars, bushings, bearings and similar precision products.

Turns Out Electrolytic Cobalt

As a result of improvements in refining techniques, International Nickel Co. of Canada Ltd. has started the first commercial production of electrolytic cobalt in Canada at its Port Colborne, Ont., refinery. Inco's entire cobalt output had been marketed as oxides and salts produced at its Clydach, Wales, refinery.

Dexter Closes Alliance Plant

Dexter Co. is closing its Alliance, O., plant and will shift production of washing machines to its Fairfield, Iowa, plant. The company was purchased by Philco Corp., Philadelphia, last spring.

Milton Steel Enlarges Plant

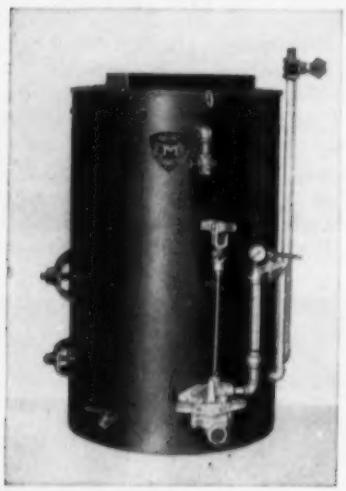
Construction of a 19,000-sq-ft plant addition to house additional fabricating and warehousing facilities has been started at Milton, Pa., by Milton Steel Products Division, Merritt-Chapman & Scott Corp., New York. Completion is expected in late December.

It's part of a $250,000 over-all

It'll Go Where Crane Won't

A crane-equipped International truck has been placed in steel-hauling service at Wisconsin Bridge & Iron Co.'s storage yard in Milwaukee. The physical layout of some storage areas restricts use of conventional cranes. Extended boom capacity is one and one-half tons. Short boom capacity, with cribbing, is five tons

"SAVES UP TO 50% OF THE FORMER COST OF REMOVING SCALE, DIRT, RUST & PAINT!" —Say Users of MACLEOD Type "H" BLAST CLEANING MACHINE



"Blast cleaning with the modern Macleod equipment has cut my costs in half. I should have discarded my old-fashioned cleaning methods years ago"—a typical comment from a satisfied Macleod user.

Low initial cost, low-cost operation and superior blasting efficiency are the secrets for the popularity of the Macleod Type H blast cleaning machine. One of its economy features is the positive shut-off valve that stops abrasive flow without releasing the air pressure within the blast tank.

The Macleod Type "H" machine is available in two standard sizes (8.5 cu. ft., and 10 cu. ft.) or in special capacities on request. It can be furnished either as a portable or stationary machine. Macleod also offers a complete line of other blast cleaning machines, cabinets, and rooms to meet every need.

57 YEARS of SERVICE TO INDUSTRY

The MACLEOD COMPANY
33 Mosteller Road, Sharonville, Ohio
Send this coupon for MACLEOD Bulletin No. 200—BLAST CLEANING MACHINES

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City _____ Zone _____ State _____

improvement and expansion program that was started by the firm since it acquired the plant late last year. Improvements already completed include additions to rolling facilities, the installation of fabrication equipment, an additional ingot preheating furnace and the rehabilitation of existing buildings.

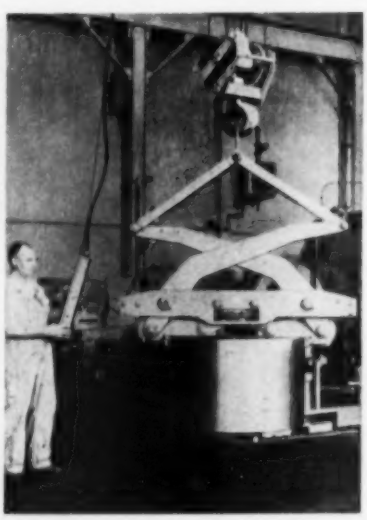
Milton Steel Products Division makes carbon and alloy steel bars, deformed reinforcing bars and a wide variety of bar-size shapes. C. R. Arbaugh is general manager.

Pfaudler Buys Schock Gusmer

Pfaudler Co., Rochester, N. Y., maker of glass-lined steel and alloy tanks for the brewery and chemical industries, purchased Schock Gusmer & Co. Inc., Hoboken, N. J., subsidiary of Sperti Products Inc. Pfaudler will transfer manufacturing operations of Schock Gusmer, maker of brew house equipment, to Rochester.

Gar Wood Opens Two Branches

Gar Wood Industries, Wayne, Mich., opened direct factory sales branches in Tulsa, Okla., and Springfield, Ill. They will distribute Gar Wood truck equipment, including refuse collection bodies,

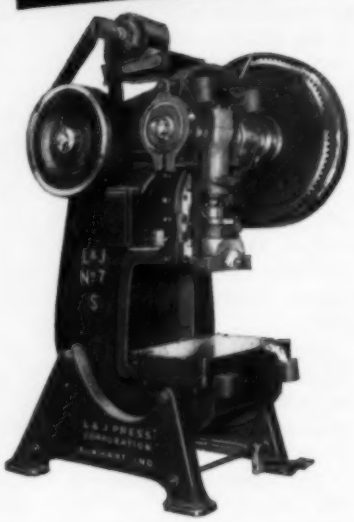


Soft, Unyielding Grip

These automatic tongs carry a 10,000-lb die block at Aluminum Co. of America's plant in Lafayette, Ind. Designed by Heppenstall Co., Pittsburgh, the tongs' nonmarring shoes support the block by its top few inches without damage to the metal. The tongs have a maximum opening of 45 in.

Better than ever . . .

L&J PRESSES *Better-Built for Better Work*



L&J Presses are producing work of better quality in larger volumes at reduced costs for numerous manufacturers. Here's why they do it:

- **Heavier, more rigid frames give minimum deflection for greater accuracy, longer die life at higher press speeds.**
- **Replaceable bronze bushings are standard equipment on two main and upper ram bearings.**
- **Roller bearings are standard in flywheel or main gear and backshaft mountings.**
- **Precision-scraped gibs of extra length for more permanent alignment and accuracy.**
- **Balanced designing plus precision manufacture for better performance and dependability.**

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. . . in the meantime, note the following features of this Philadelphia Double Herringbone Reducer:

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First reduction is through double Helical Gears and pinions, and *Final reduction* is through continuous tooth Herringbone Gear and Pinion. *Anti-friction bearings* of generous proportions, on the ends of each shaft, help absorb the load equally.

Husky, spacious housing, well ribbed and properly sized to give an adequate oil reservoir and large radiating surface for thermal capacity.

These are a few of the exclusive and proven features that have made Philadelphia Units a leader in the field for years.

These Units are available in Single, Double and Triple Reductions . . . ratios from 1.75 to 1 in the Single Unit — up to 292 to 1 in the Triple Unit. Be sure to send for 48 page Catalog H-49.

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LOW RAKE ANGLE
SHORT SECTION UNDER PRESSURE DURING CUTTING
MORE BENDING WITH HIGH RAKE
LONG SECTION UNDER PRESSURE DURING CUTTING
LESS BENDING WITH LOW RAKE

Built in all sizes for cutting thicknesses of 12 gauge to 1¼ inch and lengths up to 18 feet.

LESS

TWIST Excessive bending during cutting is the major cause of twist in pieces sheared. There is a direct relation between bending and the rake or shear angle of the upper knife. A high rake bends a piece MORE than a low rake because a SHORTER section of the stock is under pressure during cutting.

CAMBER Departure of the edges of a strip from a straight line is called camber. An important factor in causing camber is high rake which tends to rotate a sheet during cutting.

BOW Bow is deformation in a direction perpendicular to the surface of a strip. Here again experience shows that low rake gives the best results.

WHEN CUTTING WITH STEELWELD SHEARS

MORE is required of a shear than the power to cut, to achieve precision shearing. A great deal depends on how the cut is made if parts cut are going to fit accurately without additional work.

For this reason rake, or knife shear angle has been made very low on all Steelweld Shears. This of course requires more driving power and consequently a larger driving motor and heavier construction throughout than would be necessary with a higher rake. But it minimizes twist, camber and bow in pieces cut.

Because of low rake and also because of the ease with which knife clearance is adjusted to suit every plate thickness, cuts made on Steelweld shears are unusually smooth, straight and true.

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STEELWELD PIVOTED BLADE SHEARS

Heart of Quality Control

This is a close-up view of rolling mechanism of Seymour Mfg. Co.'s Sendzimir reversing cold strip mill. It is part of the equipment, valued at $2 million, which is being installed at the firm's Seymour, Conn., plant. The mill, augmented by large slitter, a Rockwell continuous strip and sheet pickling line and new annealing furnaces, will speed production and will improve quality of product

---

hydraulic hoists and dump bodies, winches and cranes. The new Tulsa branch will continue to operate the Gar Wood parts depot for ditcher and excavator parts. The new Springfield branch will continue to operate as a mounting station for Gar Wood bulldozers and power control units.

Will Build Plant in Alabama

Minnesota Mining & Mfg. Co., St. Paul, will erect a $350,000 plant at Guin, Ala., as part of its Reflective Products Division.

Baltimore Warehouse Enlarged

American Radiator & Standard Sanitary Corp., Pittsburgh, is constructing an addition (about 150,000 sq ft) to its Baltimore warehouse. James S. Toy is Baltimore manager.

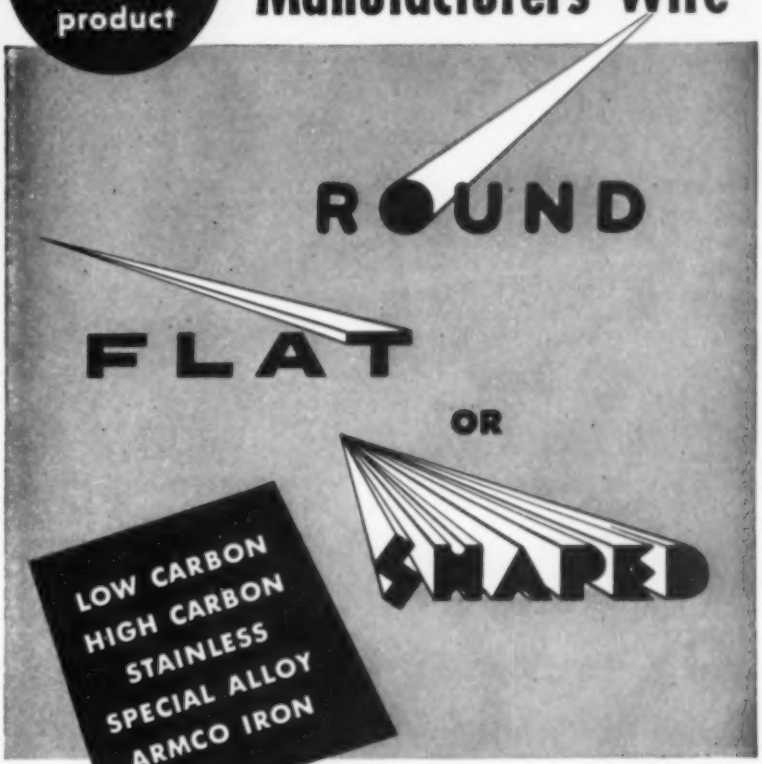
Servomechanisms Builds Plant

Servomechanisms Inc., Mineola, N. Y., is building a plant at 12500 S. Aviation Blvd., Los Angeles. The

(*Please turn to page* 98)

an ACCO product

PAGE
Manufacturers' Wire



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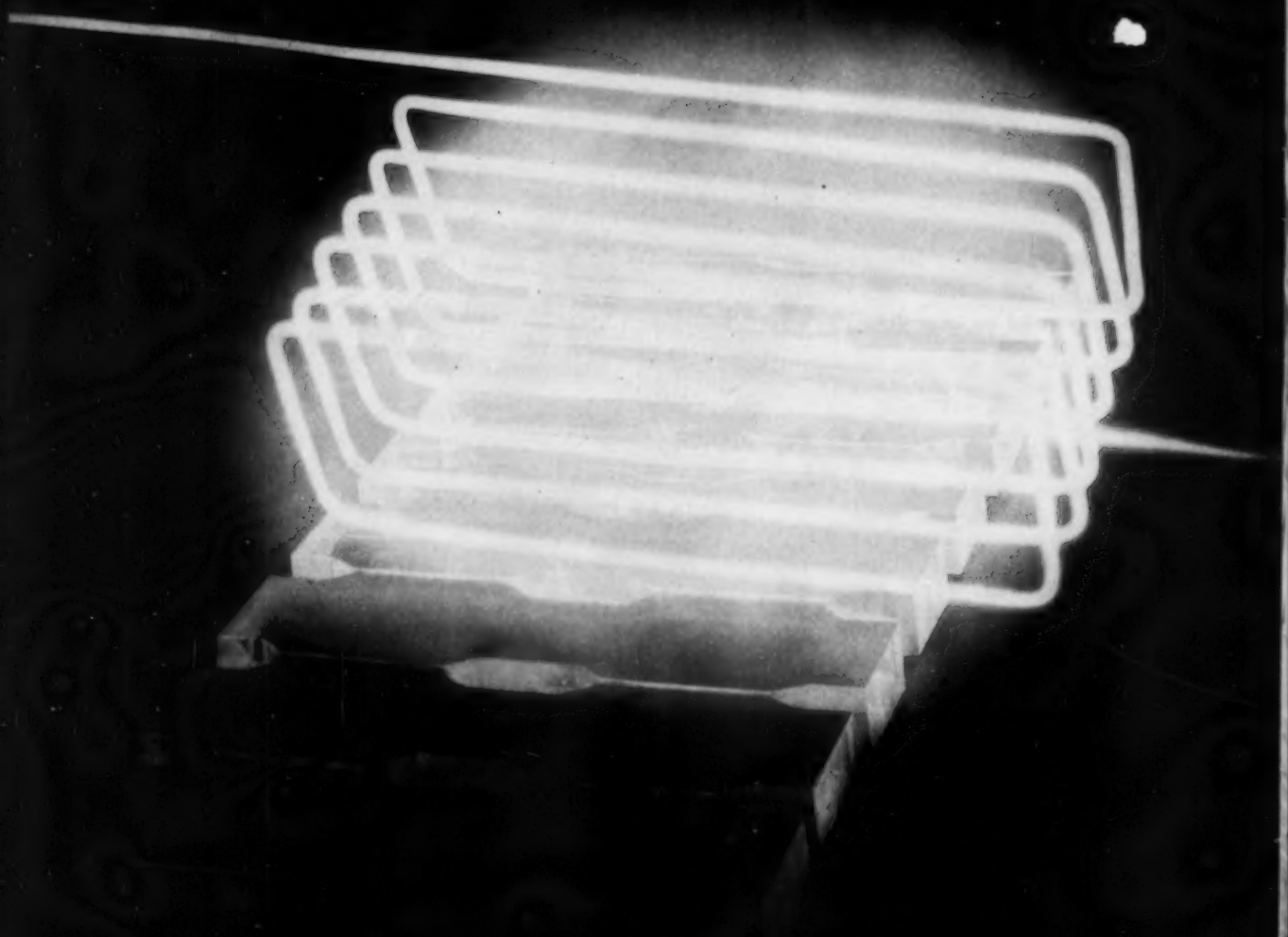
ANOTHER WESTINGHOUSE FIRST IN INDUCTION HEATING FOR FORGING . . .



New Westinghouse coil design handles irregular shapes, puts forging operations into your production line

Another successfully applied Westinghouse development, this new technique brings the cost and production benefits of induction heating to a larger variety of forging operations than ever before.

Proved in actual service, this design solves the problems of heating a workpiece having an irregular cross section. It combines the *sideways feeding* of the workpiece with a specially developed inductor coil, and offers these outstanding advantages:

- Less space required—short inductor coil accommodates many workpieces side by side during heating cycle, yielding savings in production-line length and floor space.
- Heating uniformity—control of current flow in workpiece minimizes variations in heating normally caused by irregular contour.
- Greater efficiency—less exposed workpiece area means less radiation loss. Better coupling is possible on irregular-shaped workpieces.

This new process—as well as additional ones shown at right—offers greatly increased opportunity to cut costs, speed production and improve quality in your forging operation.

Put Westinghouse induction heating to work for you . . . NOW!

Whether your forging involves regular or irregular shapes, selective or over-all heating, Westinghouse can engineer and build the right and *complete* setup to solve your production problems. Call your local representative or write: Westinghouse Electric Corporation, Induction Heating Section, 2519 Wilkens Avenue, Baltimore 3, Maryland. J-02288

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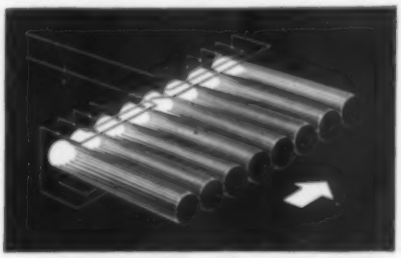
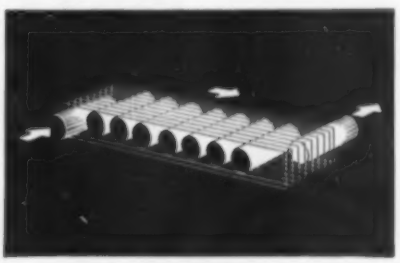
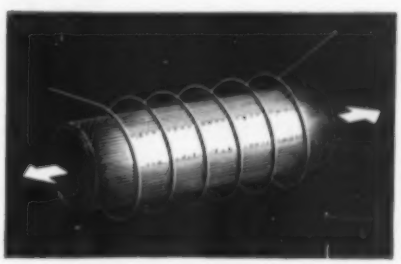
•Skilled application backed by long experience is the key factor in Westinghouse ability to make induction heating handle your individual problems. Below are three methods often used:



Lateral Feed—Bonnet Coil—Typical application: Heat 2 inches of the end of a ⅜-inch machine bolt blank to forging temperature at a production rate of 1750 pieces per hour. Adaptable to wide variety of shapes and sizes and "in-line" production.



Traverse Feed—In-Line Coil—Typical application: Through heat to forging temperature a 1 7/16-inch diameter, 13-inch long billet at a rate of 900 billets per hour. Gives maximum efficiency in heating long workpieces in greatly reduced floor space.



Coaxial Feed—In-Line Coil—Typical application: Through heat to forging temperature a 3¾-inch long, 2½-inch diameter billet at a rate of 1440 billets per hour. After heating, piece may be retracted, or pushed straight through coil for "in-line" production.

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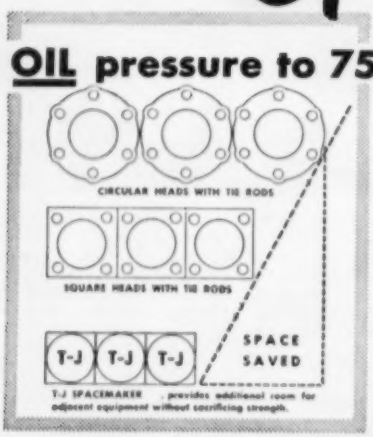
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RIVITORS AIR AND HYDRAULIC CYLINDERS CUTTERS CLINCHORS

(*Concluded from page 95*)

company produces electronic and electromechanical control systems, computers and instrumentation devices.

McDowell To Buy Wellman

McDowell Co. Inc., Cleveland, proposes to buy Wellman Engineering Co., that city. Owners of Wellman stock have until Oct. 25 to accept the offer of $18 a share, or a total in excess of $4 million. Directors of the latter company approve the offer and will vote to accept it.

McDowell Co. was organized by Robert and Lorraine McDowell about nine years ago and now does a volume of business reportedly in the $15-million bracket. Purchase of Wellman Engineering, maker of heavy machinery for the steel industry, would mark the entry of McDowell into the manufacturing business.

Tankmaker Enlarges Facilities

Maryland Tank & Engineering Co. Inc. is equipping 4000 sq ft of space at 1508 Open St., Baltimore, for the manufacture of hot water storage tanks, oil tanks, air receivers and similar products. R. E. Kitchen is president.

Hill-Chase Broadens Warehouse

Hill-Chase Steel Co., Baltimore, is erecting a 10,000-sq-ft addition to its present facilities.

Federal Buys Gardner Electric

Federal Pacific Electric Co., Newark, N. J., maker of electrical distribution and control equipment, acquired Gardner Electric Mfg. Co., San Francisco, a transformer manufacturer. Federal recently completed construction of a $3.5-million switchgear plant in Scranton, Pa.

Laboratories Incorporated

Crippen & Erlich Laboratories Inc., Baltimore, formerly Raymond C. Crippen Research & Development Laboratories, announces the incorporation of its firm. It has expanded its facilities by completion of new testing, analysis, re-

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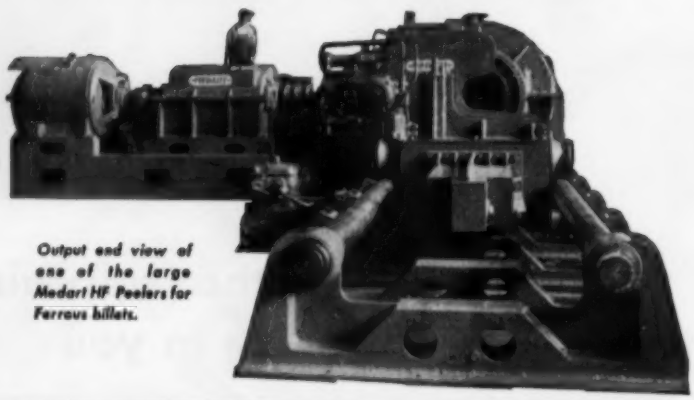
MODEL HF

BILLET PEELERS



Output end view of one of the large Medart HF Peelers for Ferrous billets.

- The output of Medart Billet Peelers is limited only by the capacity of the best available cutting tools! That means the absolute maximum in production at the lowest possible cost!
- Built to handle both ferrous billets from 1" to 14" diameter—as well as brass, copper, aluminum and other non-ferrous metals.
- Throughput speeds of these Medart Peelers range from 1' to 40' per minute, depending upon workpiece size and material.
- Can be equipped with either one or two cutterheads—arranged for high surface finish or heaviest hogging cuts.
- Furnished with hydraulic or pneumatic controls, with push-pull feed devices, and for completely automatic operation.
- No other scalping or turning machines made can match the production speed or economy of Medart's complete line of Billet Peelers.

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search and development quarters for fuels, oils, lubricants and petroleum products. The firm also does work with metals, paints, drugs, organic chemicals, agricultural chemicals and many other chemicals in allied fields.

REPRESENTATIVES

Palmer-Shile Co., Detroit, appointed two sales representatives for its materials handling equipment: W. P. Wooldridge Co., San Francisco and Los Angeles, and Carl Krasny, Cleveland.

Ajax Electric Co., Philadelphia, appointed A. C. Towne Jr., Buffalo, upper New York state representative. Mr. Towne and his associate, C. Percival Jr., also will represent Ajax in a few counties in northern Pennsylvania, including Erie.

Chelsea Fan & Blower Co. Inc., Plainfield, N. J., appointed George C. Blew its representative in Kansas City, Mo.

Steel City Testing Machines Inc., Detroit, appointed Dabar Industrial Sales Co., St. Louis, sales representative for the Kansas, Missouri and southern Illinois territories.

Pittsburgh Standard Conduit Co., Pittsburgh, appointed Paul Lumpkin Co., Charlotte, N. C., sales representative for its electrical metallic tubing, conduit and fittings.

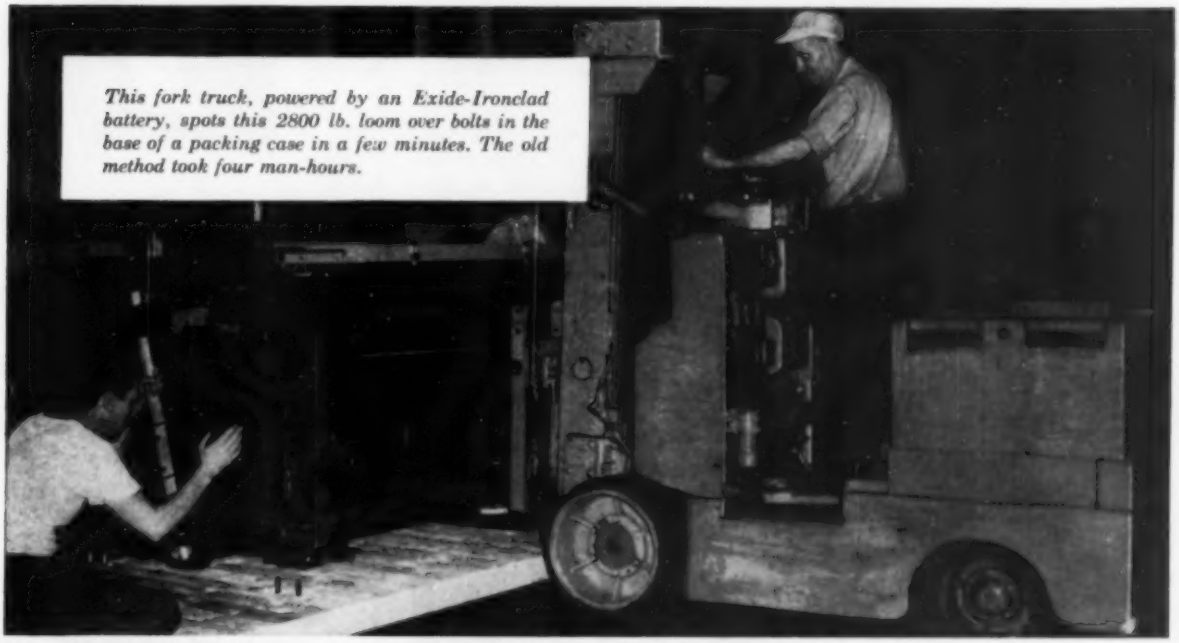
Galion Allsteel Body Co., Galion, O., appointed Power Brake & Equipment Co., Tampa, Fla., and Truck Hoist & Equipment Co., Minneapolis, as distributors of its dump bodies and hydraulic hoists.

Elwell-Parker Electric Co., Cleveland, appointed Frank L. Colker Co., Detroit, sales representative for its power industrial trucks. Mr. Colker took over the offices formerly headed by the late Frank E. Price.

True Trace Sales Corp., El Monte, Calif., maker of hydraulic valves, appointed Island Machinery Co., Farmingdale, N. Y., to handle sales, installations and service for its products. Island Machinery Co.

GET FAST, SAFE HANDLING

...with low cost Exide®-Ironclad® power!



This fork truck, powered by an Exide-Ironclad battery, spots this 2800 lb. loom over bolts in the base of a packing case in a few minutes. The old method took four man-hours.

YOU GET fast, safe and low cost handling when your lift trucks are powered by dependable Exide-Ironclad batteries. In addition, these rugged, long life batteries assure full-shift operations and high availability of equipment. Lower costs for operation, maintenance and depreciation make Exide-Ironclads your best power buy—AT ANY PRICE!

THE POSITIVE PLATES are the heart of any battery. Only Exide uses a slotted tube construction. By use of tubes, more active material is exposed to the electrolyte, providing *greater power.* Also, more active material is retained, giving *longer working life.*

THE NEW THRIFTY HAULERS! The improved industrial truck battery using *non-oxidizing* plastic power tubes for longest battery life, more capacity in the same space. For full details, call your Exide sales engineer—write for Form 1982 (Installation and Maintenance of Motive Power).

Your best power buy ...AT ANY PRICE!

Exide®
IRONCLAD BATTERIES

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

has established a subsidiary, True Trace Eastern, to handle this account. True Trace Sales Corp. also appointed International Machinery Co. Ltd., Hamilton, Ont., as its Canadian representative.

C. C. Lowry, former vice president in charge of general sales of Hajoca Corp., Philadelphia, joined Zurn Services Inc., New York, as vice president-sales. Zurn Services is an affiliate of **J. A. Zurn Mfg. Co.**, Erie, Pa., manufacturer of plumbing, marine and industrial products for which Zurn Services Inc. is the exclusive sales agent.

Adamas Carbide Corp., Kenilworth, N. J., maker of standard carbide tools, tool tips, dies and wear parts, appointed William C. Harper, Cincinnati, as its sales representative for southern Ohio and eastern Kentucky.

Louis Allis Co., Milwaukee, appointed Redmond Electric Co., Cleveland, a distributor for its motors.

Wiretex Mfg. Co., Fairfield, Conn., maker of baskets for plating, heat-treating, production and maintenance, appointed the following jobbers: Armalite Co. Ltd., Toronto, Ont.; Davies Supply & Mfg. Co., St. Louis; R. O. Hull & Sons, Rocky River, O.; Jelco Products Co., New York; Pesco Plating Equipment & Supply Co., Brooklyn, N. Y.; and Schnitzer Alloy Products Co., Elizabeth, N. J.

NEW ADDRESSES

Clark-Hopkins Equipment Corp. moved from Philadelphia to its new building on Bethlehem Pike, Montgomeryville, Pa. The firm distributes materials handling equipment, including fork lift trucks, hoists, casters, conveyors and magnesium ramps.

G. H. Kahl Co., Baltimore, sheet metal fabricator, moved its plant to larger quarters (5200 sq ft) at 343 South Fremont Ave.

Dixie Mfg. Co. Inc., Baltimore, (industrial dust collecting equipment, pneumatic conveying systems and stainless steel tanks) moved into its new plant at 1501 West Patapsco Ave., at the Washington-Baltimore expressway. The plant covers 35,000 sq ft, including 5000 sq ft of office space.

ASSOCIATIONS

American Die Casting Institute, New York, elected as its president William J. During, head of Precision Castings Co. Inc., Syracuse,

WILLIAM J. DURING
. . . American Die Casting prexy

N. Y. George Ralls, Pressure Castings Inc., Cleveland, was elected vice president of the institute, and David Laine of New York city was re-elected secretary. G. M. Rollason, Aluminum Co. of America, Pittsburgh, retiring president and a director of the institute for the last 25 years, was cited for leadership in encouraging new die casting advances. Another citation was given J. M. Davis, Union Die Casting Co., Los Angeles, for advances made in the West Coast die casting industry.

William Roy Glidden, assistant chief engineer, Virginia State Department of Highways, Richmond, Va., was elected president of **American Society of Civil Engineers**, New York. Vice presidents are F. L. Weaver, Federal Power Commission, Washington, and L. R. Howson, partner in Alvord, Burdick & Howson, Chicago.

9

STEEL's 1954 Management Series . . .

The editors of STEEL herewith present the ninth in their ten-part series, Program for Management for 1954. The complete list:

1. **How You Have To Sell** (Feb. 22, p. 91)
2. **Build Better Bosses** (Mar. 22, p. 81)
3. **Automation—How Far Should You Go?** (Apr. 12, p. 87)
4. **Stabilizing Production, Employment** (May 17, p. 87)
5. **Integrate Your Distribution** (June 21, p. 113)
6. **Personnel in Distribution** (July 19, p. 91)
7. **Transportation in Distribution** (Aug. 23, p. 89)
8. **Product Diversification** (Sept. 13, p. 113)
9. **Foremen—Bridge to More Efficiency**
10. **Product Design**

Reprints Available

If you want reprints of this and the other articles in the 1954 Program for Management Series, write STEEL, 1213 W. Third St., Cleveland 13, Ohio.

Fansteel Metallurgical Corp.

The Foremen— Make Them Managers

To most workers, the foreman is the company. Here are some suggestions that'll pay off in production-line efficiency

A MICHIGAN manufacturer had 77 walkouts involving 10 or more men between Jan. 1 and Sept. 1, 1954. Top management traced the direct cause in half the cases to foremen.

Thirty years ago this probably wouldn't have happened. The plant manager or owner was king of his industrial enterprise, the foreman his feudal lord who could outproduce and outfight any peasant on the payroll.

But Now — Today, in many plants the foreman is an abdicated nobleman—less a muscleman and more a middleman who's not quite sure where he stands. And management in plants like the one in Michigan is quick to admit its shortcoming: It has failed to recognize the importance of the foreman as the front line of the management team.

Here's what has happened. The foreman's swan song started with the union movement. Workers organized and became protected under law from many foreman abuses. A new philosophy of labor-management relations developed. Companies got bigger, and new organizational structures emerged with more emphasis on specialists in the management function.

The Result—In many plants management is making decisions and promulgating policies but is having difficulty co-ordinating them with production. The foreman is told what to do and how to do it. But because he doesn't always understand why and isn't sure when and where his duties and responsibilities begin and end, schedules don't always work out as planned.

The war, with its emphasis on all-out production regardless of cost, delayed the foreman problem as we know it today. Now, with competition getting more formidable, with costs and efficiency getting increased emphasis, the problem of clarifying the status of the foreman is coming to a head.

On the Line—Edward J. Hanley, president, Allegheny Ludlum Steel Corp., aptly puts the case of the foreman this way: "Top management may be the generator in our management system, but the foreman is the spark plug. No matter how much electricity we generate, if we have a carbon-choked, ineffective spark plug, our motor will cough like a consumptive, not purr like a kitten."

Forward thinking management is taking positive steps to clean up the spark plugs: 1. It's selecting better men to be foremen; 2.

Nine Qualifications For Foremen . . .

1. Leadership ability—Among 300 companies surveyed, this qualification was listed first.
2. Organizing ability—Three factors a foreman must organize are men, machines and materials. Employees must not be overloaded nor should they be standing around in each other's way.
3. Character—Foremen must be honest, fair and objective.
4. Judgment—Good judgment by a foreman will win the confidence of employees under him.
5. Technical skill and mechanical ability—In former years the man who was the top producer and best mechanic was the most likely foreman candidate. Today, these qualities are important, but they're not the only criteria.
6. Education—Although there are more college-educated foremen than ever before, most companies still promote foremen through the ranks.
7. Initiative—A foreman must be a self-starter.
8. Human interest—Good personnel relations in a department depend to a certain extent upon the foreman's interest in his employees' well being. The foreman is often looked to for advice on personal problems.
9. Health—A foreman must be physically and emotionally capable for his job.

Source: Small Business Administration management series.

It's giving them better training; 3. It's giving them adequate authority to do their job; 4. It's putting foremen on realistic budgets; 5. It's assigning them more responsibility in labor relations; 6. It's reviewing the company approach to foreman salaries and incentives.

In short, management is putting the foreman back on the management team. The question is how he fits into the picture.

Who's Who—Take a look at the average foreman's duties (see page 105). His is the job of trying to carry out the decisions that you make and policies that you lay down. The myriad problems of economics, sales, distribution, taxes, financing and a dozen other tasks keep you isolated from the production worker. To the worker, *the foreman is the company*: The foreman gives him his orders, listens to his complaints, pats him on the back for a good job, metes out penalties in discipline cases and hands him his pay check.

A Case of Identity

First step then in putting the foreman on the management team is to select a candidate who wants to become a foreman, wants to be identified with management. However strange it may seem, there are many men who do not want to become foremen: They do not want the responsibility; they would rather work with their hands; they're reluctant to go from "the union side of the fence to management's" in fear of what it'll do to friendships and relations with co-workers.

Case in Point—E. W. Bliss Co. at Toledo, O., has an illustration in point. The company has a foreman trainee program in which the participants must make application to enter the training. Norman Sattler, personnel manager, says that when applications are sought, only about 10 per cent of employees submit applications.

"There's no guarantee a trainee will become a foreman," Mr. Sattler says, "but we're sure that the men who do apply at least have the goal of becoming part of our management team."

A "Must"—Tests—and the field is crowded with specialists—are considered a must by most companies striving to get management-caliber men for their foremen candidates. Bliss gives three copyrighted tests to its applicants, covering problem-solving ability, temperament and personality and the ability of a man to express himself.

One midwest metalworking executive suggests careful analysis of union officials. "I don't advocate that you pick union officials for your foreman jobs, per se," he relates. "But it is an indication if a man is a union official that he is willing to take responsibility, has certain leadership qualities and probably has the respect of most members. Chances are, if a man is ambitious enough to want to get ahead in the union, he'll want to get ahead with your company too."

Getting a Good Start

Training programs vary. Some companies like Bliss have programs for training prospective foremen.

Cleveland Works of Aluminum Co. of America has a "Conference Plan for Management," which is a continuous program for all levels of management, including foremen. Other companies have plans in which they combine an informal

plant program with a formal program sponsored by a college or university.

Two-part Formula—Bliss has a normal foreman staff of 35. It likes to enter 20 men in its program, which is conducted every two years. It has two parts: Six months of formal training (one night a week) at the University of Toledo and six months (one night a week) of practical applications at its plant.

The university course is a regular one in management problems and is taught by a full-time member of the university staff.

Home Talent—Second phase of the program is patterned along the lines of many other companies. Sessions are conducted by management members, including engineers, accountants, purchasers, personnel staff men and safety co-ordinators.

Objective in the practical sessions is to give Bliss trainees an inside look at the operations, plus an over-all picture of company activities. Trainees follow through from selling and placing of the original order to engineering, purchasing and control of materials, accounting, production, inspection and final shipment.

The Results—When the program is completed, trainees get a "graduation dinner" and are placed on the mailing lists of publications of interest to foremen. Bliss admits it may be a considerable wait between training and the time a trainee actually becomes a foreman. But the value of the program is that there is a known reserve. Says Norman J. Kirk, vice president: "Of equal importance is the fact that the employees trained, some of whom may never become foremen, are definitely better employees because they understand the responsibilities of foremen, more of the problems of management and why certain policies and practices are necessary."

Alcoa's plan works like this. Conferences for about 500 men are held each two weeks. Top management makes the final selection of topics, but many come from recommendations by the members of the conference on what they'd like covered. The members are split into small groups of about 20, and conference leaders conduct sessions. Leaders are selected by the training department—with the approval of the plant manager—and are given special instruction in conducting the conferences.

Plus Factors—In addition, Alcoa foremen get special spot training at different periods, covering topics like job instruction, public speaking, interviewing and report writing.

Your program should fit your individual situation. The seven guideposts on p. 106 can help. There are many sources to which you may go for assistance in setting up a program. Your industry association, National Association of Foremen, American Management Association, local Chambers of Commerce and industry groups are a few.

Leader—Or Errand Boy?

To be an effective member of management, the foreman must have adequate authority to carry out his responsibilities. In the absence of proper authority, or-

Human Relations

1—Maintain good relationships with employees, other departments, his superiors and the union.

2—Settle grievances.

3—Operate his department in strict accordance with company policy and the union contract.

4—Develop and maintain job interest among his employees.

5—Be available to employees when they need assistance—either of a business or personal nature.

Training

1—Inform new employees about company policies.

2—See that new employees receive adequate job instruction.

3—Train an understudy who can take over in absence of the foreman or if he is promoted.

Production

1—Co-ordinate men, materials and equipment in the department to meet production schedules set up by superior.

2—Maintain product quality; see that equipment is kept in good repair.

3—Keep alert to possible new methods and procedures that will cut costs, improve quality.

4—Keep department costs within his budget.

Source: Small Business Administration management series

Foreman's Duties—The First Line of Management

NTDMA

Seven Guideposts to Better Foreman Training

1. Define the objectives of your program.

Give the foreman a better grasp of his duties. Enlarge his knowledge of materials and equipment. Aid him in improving his employee relationships. Familiarize him with company policies and plans—dramatize the relationship between his department and the company.

2. Fit the course to the trainees.

Evaluate their backgrounds, strong and weak points and beam the program to fit those requirements.

3. Relate the program to the company and the industry.

Show the foreman the "why" of company policies and actions in production changes or improvements. Talks by department heads from engineering, accounting, sales and purchasing will help broaden the foreman's understanding of the company. Circulate pertinent trade magazines which carry industry-wide articles of importance.

4. Make participation significant.

If a foreman is to function as part of the management team, he must learn to make decisions and express himself. Encourage participation in training sessions. Include him in management conferences and planning sessions and invite his ideas and opinions.

5. Integrate the program with advancement and promotion.

Self-improvement is a major factor in the foreman's view. Design your program to prepare the foreman for a better job when he's ready for it.

6. Capitalize on social values.

A greater spirit of co-operation between departments can be developed if foremen have the opportunity for social, as well as business association. Foremen's clubs, recreational meetings, bowling parties and affairs including the wives help build better foremen relationships.

7. Follow up your initial training with a continuing program.

After the formal training program is complete, don't drop the foreman into his own little world and forget him. Have periodic sessions to discuss some particular problem like absenteeism, turnover, cost cutting and similar problems. Not only will some of the problems actually get solved, but foremen will feel more like they're part of the management team.

Source: National Foremen's Institute.

ders from a foreman tend to become weak relays of instruction by an "errand boy."

Communication helps the foreman establish authority in his department. If key policy changes or programs are announced simultaneously by top management and foremen, the workers regard the foreman as just another co-worker. You can do much in making the foreman *feel* that he belongs to the management team by leaving a major portion of the communicating to employees to him.

Foremen First—Putting the foreman in the key communications slot has two benefits. First, it's easier to take the relatively small group of foremen aside and explain the announcement in detail. Then you can make a general announcement to the employees. What they don't understand, they can get from the foreman. Second, there's less chance of misunderstanding. Broadside communications run the risk of misinterpretation, which can result in trouble before explanations can be made.

Some companies like Thompson Products Inc., Cleveland, get out a weekly newsletter to supervisors, which contains information for the foreman to pass on to his employees. Beating the "grapevine" is one of the major problems reported by most officials who follow the "communicate first to foremen, then to employees" formula.

Grapevine Advantages — This type of communications can't be stopped, however embarrassing it becomes on occasion. Wise management is using the "grapevine" as a two-way street in which the foreman plays the key role. "What other executive has enough continuous close contact with the workers to spot danger signals," emphasizes one personnel manager. "Picking up shop talk and employee sentiment and recognizing the danger signals so that corrective action may be taken before trouble develops is part of a good foreman's responsibility."

Foremen should share authority in hiring, discharging and disciplining employees. Most companies contacted by STEEL have disciplinary action well spelled out in company policy, with the foreman having authority to administer the penalty. In the more serious

cases, such as an extended layoff, the foreman is required to consult with the personnel manager or some other higher-level executive before the action is taken.

The Discharge—As a general rule, discharging an employee is done by higher authority, although the foreman makes the original recommendation.

Another method of letting the foreman know he is an important link in the management chain is to give him some voice in hiring his men. Best application of this is with highly skilled employees—naturally, in large and medium-sized companies the employment of most workers is accomplished best by the personnel department. But when highly skilled workers are involved, personnel people are seldom familiar with the practical side of the skill. The department foreman, on the other hand, can talk with the individual and readily ascertain whether he's qualified for the particular job in question.

A Good Start—Another important aspect: Such an arrangement establishes immediate rapport between the worker and his foreman. To the worker, the foreman is not only his boss but a "pretty good fellow because he hired me." To the foreman, the worker is a man "I hired, and I'll have to help him make good or I'll look bad."

Another factor in delegating authority to foremen is to assure them of top management's complete backing. Changing a foreman's decision tends to break down the worker's respect of both the foreman's ability and authority. Training a foreman to weigh his decisions carefully is important. Many plants instruct foremen that when they are confronted with a question or problem they can't handle on the spot, they should tell the employee they'll think the matter over. This gives the foreman time to consult with the proper official for an answer and return it to the employee.

A Good Practice—Emphasize to the worker that the foreman is your front line of management. They should be discouraged from trying to go over the foreman's head with their problems. Bliss has a stock answer to all employees who try to by-pass the foreman: "Have you discussed this with your foreman?" This practice also reassures the foreman that he is a member of management.

Foremen and the Contract

Other than in actual production, labor relations is one of the areas in which the foreman is playing an increasingly important role on the management team. Recent emphasis on personnel departments and industrial relations usurped some of the foreman's activities in this field.

But what other management member has the day-to-day contact with the actual operations of your union contract? Grievances normally start on the foreman level. A good foreman can backstop most conflicts with the union. Having come up through the ranks—and perhaps having been a union official—the foreman should have a good working knowledge of your contract. He can take immediate action to correct poor working conditions from which many grievances evolve.

Experience Counts—George Piccoli, director of industrial relations for Associated Industries of Cleveland, states that seeking the foreman's contract change suggestions is a "must" before opening your negotiation talks.

In their day-to-day relationship with the employees and your contract, foremen do more collective

Are Your Foremen Really Managers?

Saddling the foreman with other-than-supervisory chores can cut his efficiency as a member of the management team. Top management may be responsible for assigning the foreman many nonsupervisory duties, but too often the foreman himself is to blame.

At Aluminum Co. of America's New Kensington (Pa.) Works, a time distribution study was made to determine how foremen spend their time. As a result, G. S. Quin of the training department reports, foremen became conscious of their role of supervisors and began to act accordingly.

This was the time distribution average for extrusion press foremen:

- 31.5% spent on direct supervision at the press.
- 3.4% checking ingots, ingot supply, etc.
- 7.7% checking tools (includes time in the die room).
- 5.8% checking and delivering schedules.
- 5.7% eating and washing up to go home.
- 20.8% miscellaneous: passing out bonus slips, reading office correspondence, conferences and meetings, distributing paychecks, other.
- 2.0% checking and instructing die checker.
- 4.3% writing reports.
- 5.0% hunting men, materials and equipment.
- 1.8% talking to employees on floor but out of work area.
- 7.0% sitting in office talking to other foremen.
- 3.5% walking to press area.
- 1.5% walking to office.

Alcoa officials analyzed their reports and were able to spot weak points and help foremen take corrective action. Three examples:

1. Survey indicated that foremen were doing too much die checking, a job properly assigned to die checkers. Foremen were urged to leave the work to the die checkers.
2. Too much time was spent looking for materials and equipment, indicating poor organization. Each foreman sat down with division superintendent to analyze his job, seeking to eliminate nonsupervisory activities.
3. Checking ingot and metal supplies took too much of the foreman's time. Such work is not properly part of a foreman's responsibility; job should go to an hourly-rated employee.

bargaining than you'll find in actual contract negotiations.

Check the Record—Make it a policy to call your foremen together for a contract discussion meeting. Go over the clauses that relate to foreman-worker relationship. Find out which were the causes for most grievances during the past year and try to determine what changes are necessary to make the contract more workable.

They're Businessmen, Too

Growing competition is helping to expand one phase in the movement to put the foreman on the management team. That's foreman budgeting on a realistic basis. Accounting and engineering departments develop elaborate systems of figuring costs and ways to reduce them. But when the program reaches the production line, it often runs afoul. One possible reason: The foremen were not included in the plan.

No Yardstick—In too many companies today the foreman is told his manpower costs are so much a day, his materials so much a week, his overhead so much a month. Perhaps each month he's told he was high in a certain category and should cut down. But he has no specific gage by which he can measure his costs and take a realistic approach to correction.

"When many of the items you produce cost only fractions of a cent, you've got to have close control over your costs," says Emil Gibian, staff director of industrial engineering at Thompson Products. "Our foreman's budget helps us keep that control. By-products are the ideas foremen get to cut costs because they have the budget and understand how it operates."

Set Standards — Thompson, in setting up its program in 1946, first investigated every item of expense in a foreman's department, direct and indirect. Then it set up budgeting standards based on past experience to determine what expenses a foreman should be allowed.

A foreman's budget is broken down so that he can see in detail the actual costs involved. For example, under nonoperating labor of manufacturing expense are such items as inspection, setup, repairs, idle time, breaking in new help. Under nonproductive labor classification are inventory taking, cleaning machines, employee relations, overtime premium, vacations.

Frequency—Thompson's foremen get a daily report on labor and

Average number of workers supervised per foreman Class I, by size of plants (all industries).

SMALL PLANTS, UNDER 100	20 WORKERS
MEDIUM PLANTS, 100 to 500	30 WORKERS
LARGE PLANTS, 500 to 1000	46 WORKERS
PLANTS WITH OVER 1000	48 WORKERS

Average number of workers supervised per foreman Class II, by size of plant, (all industries).

SMALL PLANTS, UNDER 100	15 WORKERS
MEDIUM PLANTS, 100 to 500	20 WORKERS
LARGE PLANTS, 500 to 1000	30 WORKERS
PLANTS WITH OVER 1000	30 WORKERS

How Many Workers Should A Foreman Supervise?

There's no ideal number of men a foreman should supervise, say the experts. It'll depend upon the type of operation done in the foreman's department and how the foreman fits into the company organizational structure. Some plants have foremen as first level supervision who report to department or plant superintendent . . . in some plants a general foreman has several assistant foremen under him.

A National Foreman's Institute study divided foremen into Class I and Class II groups. In the study NFI's Class I foremen generally have responsibilities listed on page 105 and work under direction of plant superintendent or general foreman. Class II foremen perform similar work, but have fewer years experience and may be training for Class I positions.

Foreman—Five Failure Types

1. The man who doesn't want to be a foreman.
2. The man who believes he's always right and never makes a mistake. He'll be a troublemaker.
3. The buck-passer—he'll say yes to union pressure, yes to the front office, yes to the men under him. Playing both ends against the middle, he'll create considerable dissention.
4. The socializer—this foreman will tend to be indiscriminate in his friendliness and may encourage everybody to be lax in his duties. If he plays favorites, he'll encourage rivalries and formations of cliques.
5. The man who just can't get things done—he doesn't know how to direct people, feels he's not liked if he gives too many orders, and, consequently, tries to work out problems alone.

Source: Klein Institute for Aptitude Testing.

tool expenses, weekly report on material and supplies. At month's end a detailed dollar and cents breakdown of all expenses is given them.

Mr. Gibian suggests two important factors in setting up foremen budgets: 1. Foremen must understand the workings of the budget so that it becomes an effective tool for him. Special classes of instruction may be necessary to give the foremen that understanding. 2. The reports should be frequent enough that any irregularities can be spotted and corrective steps taken in a minimum of time.

Cost Perspective—In this type of program, it's the relatively little things that add up to savings by making the foreman more cost conscious, officials point out. For instance, without a budget a foreman may have paid considerable attention to the number of $22 tools being used each month in his department, but little attention to the number of $2 tools used daily. Actually, the volume of the cheaper tools used might easily overshadow the expense of the higher priced ones. But without a budget it isn't as obvious.

What's the payoff? Thompson cites many illustrations. One alert man in checking over his expense sheet noticed that indirect labor costs in a wrapping and packaging operation were high. By making a few procedure changes he reduced the number of indirect labor people necessary for the job from 15 to 7.

Make it Realistic—A realistic budget places the foreman in the role of an individual businessman. Costs take on new meaning when they're understood.

Compensation

Foreman compensation is another important factor in the problem of clarifying the status of the foreman. Under consideration in many plants is a new approach to foreman compensation. When his compensation is related to the income of the hourly worker, the foreman tends to be identified with the hourly employee. If the foreman is to be considered part of the managing team, then his salary must be related to that of the rest of management.

Wartime operations with the emphasis on overtime served to point up the problem of compensation. Many plants found that with foremen on straight salaries, some men under them were taking home fatter paychecks because of overtime premiums. So foremen were paid overtime rates and the accepted practice became to maintain a 15 to 30 per cent differential between the foreman's pay and that of the highest paid men in his charge.

What's Wrong—The dangers of this plan, however, are clear: 1. It tends to identify the foreman with the hourly employees rather than management. 2. It tends to give the foreman a vested interest in maximizing the earnings of the men under him.

Two approaches are suggested. The first is to define clearly the responsibilities of the foreman and establish standards of performance

A Case in Point: Foremen Must Be Members of Management

Are Foreman Unions Practical? No, Says Ford Motor Co.

In its reluctance to accept foremen as part of its team, management creates a third force—one between management and labor. So it is only a natural inclination for foremen to want to organize and belong to some group. The Foremen's Association of America was founded at Ford in 1941, and when Ford signed its first UAW-CIO contract that year, the Foremen's Association asked recognition as a bargaining agent. A contract was granted, and for 5½ years Ford tried to operate with a foreman's union. It didn't work for two basic reasons:

1. Inherent pressures in collective bargaining with a supervisory union lead to divided allegiance, irresponsibility, lowered morale and a decrease in managerial efficiency.

CASE A—In May, 1943, officials of the UAW-CIO assured Foremen's Association officials that in case of a foremen's strike, UAW workers would continue working, but they would not take the jobs of any foremen while they were on strike. In the 1947 foremen's strike, the Association appealed to the UAW to join the strike against Ford.

CASE B—A Foremen's Association official working in a tool and die plant was told by a superior to determine whether groups of employees were making a practice of loafing away from their jobs. The Association official instructed his fellow foremen not to comply with such an order and refused to do so himself.

CASE C—The UAW in April, 1947, ordered its members to leave their jobs to attend a mass labor rally in downtown Detroit. The Company felt this to be a violation of the contract and instructed the foremen to notify the men accordingly. Foremen's Association officials countermanded these instructions. The Association not only encouraged the walkout, but over 1000 of the foremen joined it.

2. Supervisory unions foreclose merit and initiative by insistence on seniority.

At Ford's insistence, the Foremen's Association agreed to a provision in the 1944 contract that seniority would only prevail in cases of equal ability in foreman promotions, layoffs or demotion. Ford reports 40 per cent of all Association grievances filed were on this issue. Typical excerpts from grievances include:

"It is the Association's contention that ability in the instant case is not a factor since the question of Mr. Moore's lack of it had never been discussed . . . the new contract between the company and the CIO incorporates a clause stipulating that in case of a reduction in force, demotions or layoffs will be made on a strict seniority basis. The Association sees no reason why this should not also apply where foremen are concerned."

along the lines of those set up for other management positions. The second is to set up an adequate management-oriented stimulus to foremen through carefully developed incentive plans. These will tend to focus attention away from hours of work, holiday and overtime pay and differentials. Attention will be concentrated on responsibility and performance.

Cost Control—Getting attention today are foremen incentive plans based primarily on cost control systems. Accurate standards are set up for a foreman's costs; then a certain percentage of savings realized for superior performance is set aside for the foreman's incentive. Such systems can be based upon individual foreman performance and/or plant-wide performance in which foremen participate in a co-operative incentive program.

Under consideration by many companies are bonus and pension-type incentives for the foreman. Fairbanks-Morse Co., Chicago, is getting away from any fixed percentage system of incentives. Instead, it annually sets aside a percentage of the profits to be distributed as a bonus to foremen and other management members. The individual's share is derived from a subjective approach to the individual's job and his performance of that job during the year.

Prestige Building

In making your foremen part of your management team, don't overlook the seemingly minor, but important, "prestige building" factors. In these areas you can give psychological lift to management's side of the fence with comparatively little cost.

An eastern metalworking company took the problem to the foremen. In addition to some of the major points already covered, officials were surprised at the importance foremen placed on such recognition items as special parking areas, lunch rooms, exemption from punching time cards, normal management privileges of an occasional day or couple of hours off for legitimate reasons.

The Old Stand-by—Occasional dinner meetings for foremen and their wives are good morale builders, they also do much to develop interdepartmental co-operation between foremen.

Without efficiency on the production line, there are no profits. And it's here the foreman plays a key role for management—he's close to production costs, to individual employee effort, to employee morale. To the employee, the foreman is the company. If he's going to function effectively, he must be a member of the management team.

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STEEL
October 11, 1954

Technical Outlook

RE-CONSIDER— Design ingenuity will determine the progress of aluminum impact extrusion techniques, according to Homer Harvey, vice president, Harvey Aluminum. Recent advances in the field: Closer dimensional tolerances, high speed production, use of most of the standard hard and soft aluminum alloys and time-cost savings with special impact techniques for many types of extrusions.

DUCTILE IRON— Uses for ductile iron continue to grow apace. It's beginning to be used by aircraft and automotive industry as a die material. Other places you'll see it: Crankshafts, gears, gas turbine parts, diesel engine pistons, agricultural implements, heavy press parts and metalworking rolls.

TURBO-WELDER— Power source for an experimental arc welder developed by Hobart Brothers, Troy, O., is a small gas turbine. Light weight and small size are among advantages claimed.

SENSE OF TOUCH— A tank gage that senses the depth of liquids by electronics to an accuracy of $\pm\frac{1}{16}$ in. has been announced by Gilbert & Barker Mfg. Co. of West Springfield, Mass. The company says it will measure any petroleum product at temperatures up to 175° F, is not affected by low pressure or specific gravity, requires no guides or wires inside the tank and will transmit its data to remote points.

READY— DeVilbiss Co. says its catalyst spray gun is ready to go to work to speed resin development and formulations. (See Technical Outlook, June 28.) Resin is fed to the gun through the fluid line, and the catalyst goes into the air stream. The gun has but one head. When the trigger is pulled, catalyst and resin meet outside of the air cap and are atomized uniformly, so the correct amount is applied to the surface being finished.

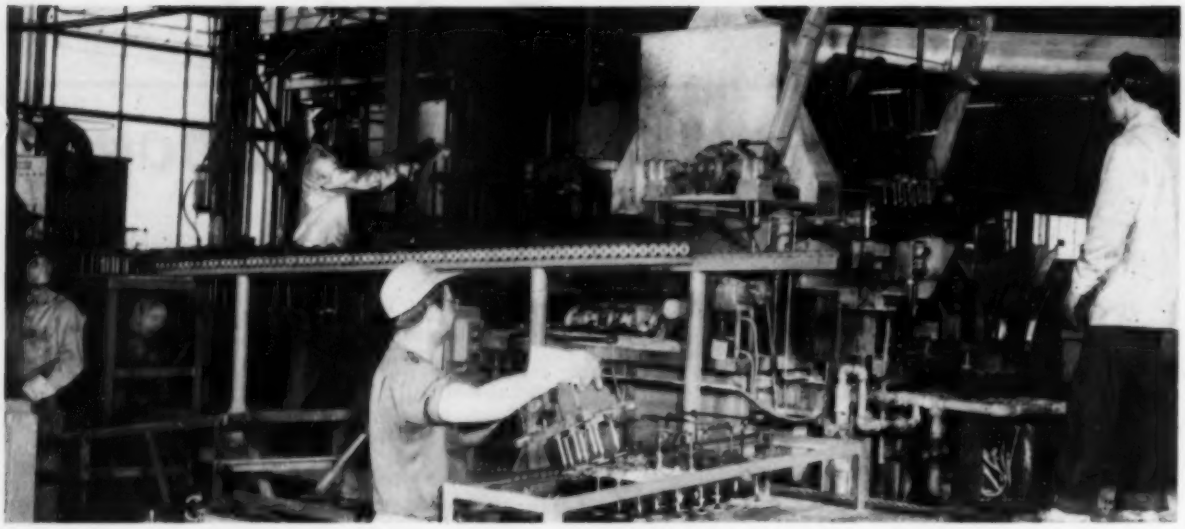
FORK LIFT MAGNET— An electromagnet holds loose tinplate tightly on the forks on a lift truck without pallets or grips of any other kind. Automatic Transportation Co., Chicago, is mounting it on its own line of fork-lifts, but it will fit others.

NO DOWN TIME— Furnaces to supply the new-found demand for vacuum melted metals are designed to operate continuously without breaking the vacuum. For instance, Consolidated Vacuum Corp. says that in its 1000-lb ingot furnace one charge is melted and poured in the vacuum chamber while a new charge is introduced through an air lock. Ingots are removed from an air lock as soon as they are cool enough to handle.

MORE LAMINATIONS— Now running at 180 strokes a minute, a new 100-ton Danly press turns out 360 transformer laminations, "E's" and "I's", a minute at Allegheny-Ludlum. Eventually the automated setup will be stepped up to 225 strokes a minute.

TEMPERATURE TAKER— System for remote reading of gas turbine blade temperatures has been announced by the Bureau of Standards. It includes high temperature resistance thermometers that withstand large centrifugal forces, an inductive commutator that transmits signal information from the roaring rotor to external equipment and electronic circuitry that interprets the signals as temperature measurements.

Metalworking Outlook—p. 55 Market Outlook—p. 167



Pontiac's Aldip installation. Salt bath and aluminum dip in background, air blast right, air cool and rinse in foreground

Dip Valves for

Aluminum coating process promises longer life for automobile engine valves. Pontiac is coating valves now; Others will have them on 1955 models

YOU MAY HAVE PAID $40 for a valve grinding job for the last time.

General Motors Corp. thinks aluminum may hold the answer to a burned-valve-victim's prayer. Since November, 1953, its Pontiac Motor Division has been using the Aldip process to aluminum-coat automobile engine valves.

They're sitting tight on performance figures, but results are evidently spectacular. Pontiac is increasing production of coated valves to equip its 8 as well as its 6-cylinder engines. There's a good chance the '55 Chevrolet engine will have them also.

Oxide the Answer—Iron-aluminum alloy forms an ideal coating for engine valve seat faces. The hard smooth oxide surface is not easily broken loose. It conducts heat more readily than steel. It is lead-compound resistant. Best of all, it increases valve life by increasing resistance to high-temperature oxidation.

In steel valves under the tremendous heat of high compression engines, iron oxide builds up rapidly on the valve seat face. Then the oxide begins flaking off, the valve seat "gutters," burning gases escape and the valves burn. An aluminum coated valve tends to maintain a smooth, compression-tight seat even when oxidized.

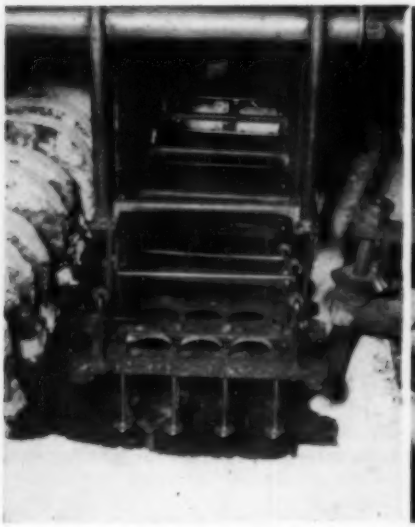
Versatile Coat—Aldip was first announced in June, 1952, (see STEEL, June 16, 1952, p. 82). The process was tried as a corrosion-resistant coating for ferrous metals, substituting for zinc in some applications. As a heat-resistant material, the process found use in coating diesel engine manifolds, and auto-plant fixtures subject to heat and acid attack. Coated on plain steel automobile muffler inner tube assemblies and tail pipes, it lengthened their life span several times over.

Engineers became interested in aluminum-dipped valves when they saw the increased life of Pontiac's aluminum-coated tailpipes and aluminum-coated steel fixtures used in the heat treat department. Starting from pilot studies by Alfred L. Boegehold, D. K. Hanink and others at the Technical Center, the division has developed a production unit that is now coating 3000 valves a day.

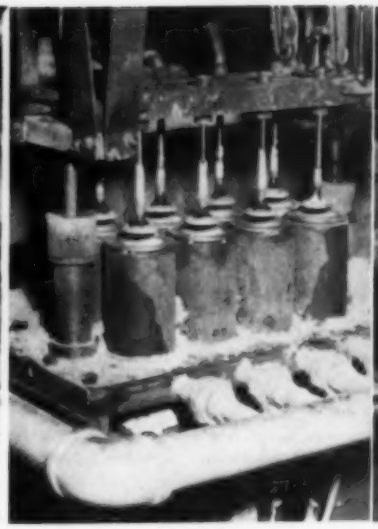
Simple Idea—Simply, the process consists of immersing the valves in molten fluxing salt after cleaning, and then dipping them in molten aluminum. Unalloyed aluminum remaining on the valves is removed by air blasting. The molten aluminum actually penetrates the valve seat face, combining with iron to form an alloy shell 0.0010 to 0.0015-in. deep. Reducing qualities of the aluminum keep the iron in an unoxidized state.

Heart of the process is a 150 kw—460 volt fluxing furnace, which combines a salt bath and molten aluminum dip in one unit. Valves are pre-heated and aluminum-dipped without ever leaving the salt bath.

Tricky Application—An ingeni-



Valves entering the salt bath



Valves entering air-blast stripper

Valves being released into rinse

Higher Performance

ous tray filled with 2 in. of molten aluminum in the bottom of the salt bath performs this sleight-of-hand. As valves in the supporting racks move through the salt bath head down, the tray rises on a cradle until the aluminum bath envelops the valve heads. Then the tray backs off.

The salt bath is continuously subject to oxidation by contact with the air and contamination by oxides on fixtures and work. Its fluxing potential is maintained by the molten layer of aluminum which combines with the contaminating oxides to keep the bath rectified. Ajax Electric Co. Inc., Philadelphia, built the salt bath-aluminum dip furnace.

Other units in the set-up include a vapor degreaser, air blast stripper to blow excess aluminum from the valves, and a rinse tank. Movement through the salt bath and air-blast stripper is accomplished by hydraulically actuated mechanisms. Transfer of the valves through other steps is by hand.

Trip Through the Dip—The Aldip sequence is:

1. Clean valves in trichloroethylene vapor degreaser.
2. Lock valves in rack, head down.
3. Lower rack into salt bath held at 1350° F for 2½ to 3 minutes.
4. Immerse valve heads ½ in. in molten 2S aluminum for 10 seconds.
5. Transfer rack to air blast device. Blow off unalloyed aluminum.
6. Air cool valves to 300° F.
7. Release valves from rack into hot water quench-rinse.

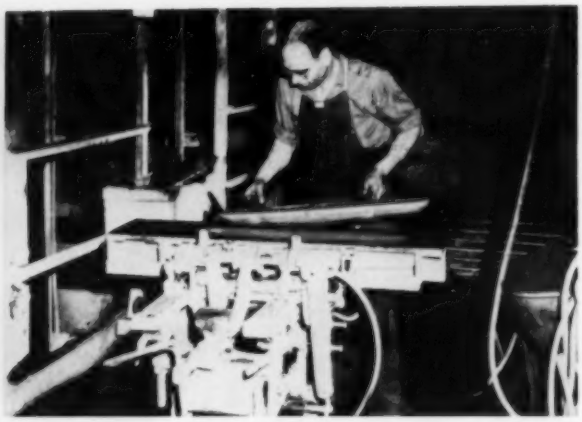
Cycle time is about 8 valves every 30 seconds.

Beating the Heat—Biggest concern has been the high temperature of materials in the process. The salt bath, a special mixture of alkali chlorides and aluminum fluorides, is held at 1350° F. That calls for a special furnace lining. A porous ceramic lining into which the salt penetrates to form an insulating layer does the trick.

Although the molten flux is kept in circulation by the electrodynamic action of immersed electrodes, a propeller agitator is needed to assure uniform heat transfer between the flux and aluminum. Normally, the molten layer of aluminum is covered with a layer of sludge which decreases heat transfer and results in low temperature of the aluminum. The agitator creates circulation to push aside the layer and assure transfer of heat from the flux to the aluminum.

Process Holds Promise—Best indication of how GM rates the process is that facilities are being expanded. Besides Pontiac and Chevrolet, Canadian plants are getting the equipment. Other automobile and valve manufacturers are showing interest. Thompson Products Inc., Cleveland, is adopting the process. Undoubtedly, they all have in mind the ultimate consumer. The prospect of no more burned valves is a powerful incentive to buy.

Metal is poured at 2870° F. Brinell tests made on one casting out of eleven read 241 to 255 after heat treat



Barrel core halves are hand-rammed. Loose center section is removed so core will collapse as casting cools

CASTING TOLERANCES . . .

Keyed to a Target

Careful preparation of the cores plus close control of all other operations help make this cast shell fit for pinpoint firing. Core is held to ±0.025 in.

WHEN YOU'RE FIRING artillery shells at a range of better than 4½ miles, precision with which the shell is made has a direct effect on its ability to stay "on target" all the way.

During firing tests on alloy steel cast shells at Aberdeen Proving Grounds in Maryland, all five rounds first fired were grouped neatly in a 29-sq yd target at 23,000 yd. Conventional shells strayed considerably.

Size—The shell casting is 49.375 in. long with 11.012-in. OD at the back. Nose tapers to 2.38 in. Nearly 1500 lb of metal is poured into each mold to get a sound, finished casting weighing 600 lb.

Key Core—From the standpoint of dimensional accuracy and balance of the finished shell, the most critical core in the mold assembly is the barrel core, which forms the shell cavity. It's a hollow, cigar-shaped core that forms a cavity in the shell about 8¾ in. in diameter at the widest point. The cavity is 41 in. long. Opening at the head end is about 4¼ in. in diameter.

This core is hollow to permit easy collapsing during contraction of the casting when it cools to avoid distortion. The core has two 48-lb longitudinal halves pasted together. Wall thickness varies from 1¼ to 1½ in.

Reinforced — Core halves are made on four rockover machines in aluminum boxes with a loose piece to form the cavity. This loose piece is held in place by four toggle clamps during hand ramming.

Four $\frac{3}{16}$-in. wires laid lengthwise, plus a piece of expanded metal mesh at the head end, are used in each core half for reinforcement.

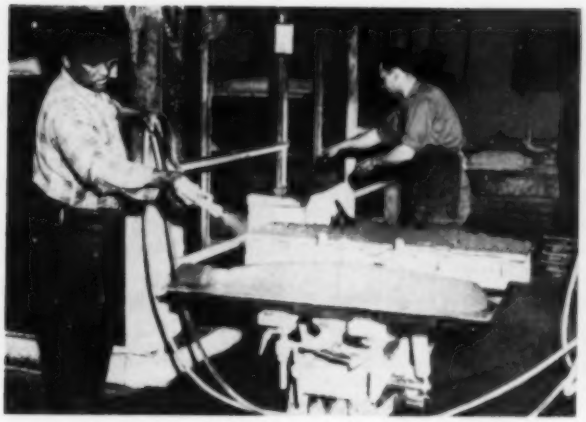
Silica Spray—After the core is rammed, the loose piece is removed and an aluminum drier placed in the cavity. An aluminum bottom board is placed on top and clamped in place.

The assembly is rolled over to the other side of the machine and the box vibrated and lifted off the core. The core is sprayed with a silica wash and then loaded into an oil-fired tower oven.

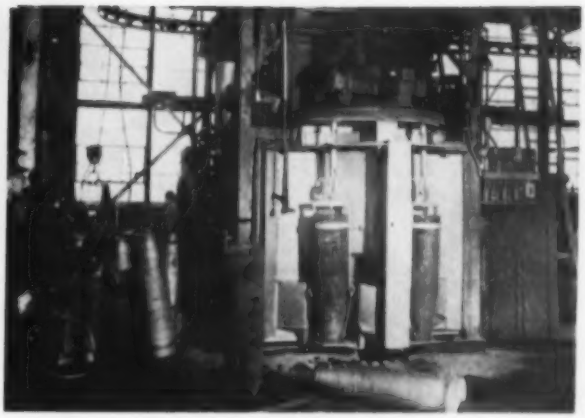
Cool Off—After baking at 490° F for 2 hours, cores are unloaded and given another wash spray. Next, they're taken to a cooling area.

When they're cool enough to handle, the cores are removed from plates and driers and placed on wooden shelves.

Assembly—Two core halves are rubbed together for a snug fit and the outside diameters of the assembly checked with a ring gage. Halves are then pasted together, and three aluminum holder rings,



Green barrel core halves are sprayed with a silica wash before they are baked at 290° F for two hours



Shells are blast cleaned inside and outside simultaneously. Tube through shell opening cleans inside

one at the center and one at each end, are placed on the assembly to hold the halves together. Cores are then air-dried for 24 hours.

Checking — After the air dry, holding rings are removed and two aluminum test rings are placed on the core. Core is set on a testing machine and is rotated.

Contact gages at four positions along the length of the core actuate dial indicators to show concentric variations. Acceptable tolerance is ± 0.025 in.

Drying—After removal from the testing machines, cores are touched up with wash and are pushed through a propane-fired horizontal oven for drying at 200-250° F: Drying time is 15 minutes. Next, they go to the foundry.

Body cores forming the outside of the mold cavity for the shell are made on jolt rollover machines. They are about 20 in. square and 4 in. thick. Each body core section is reinforced with two U-shaped, $\frac{3}{8}$-in. diameter rods inserted in each side.

Stabilizers — Mold sections are assembled on a square steel plate. Bottom section has two holes extending from two edges through the center opening.

When the barrel core is placed in the mold, after the first five body cores have been assembled, a long drill is inserted in the holes of the base core print and holes drilled into the barrel core. Two $\frac{5}{8}$-in. steel rods are then fitted into the holes to hold the barrel core in place.

Gates and Risers—Eight more body cores are placed in position and the assembly is clamped. The semicircular runner and the two ingates, placed opposite each other on the periphery of the mold cavity, are between the fifth and sixth cores from the bottom of the stack.

Cylindrical risers above each ingate extend up to the tenth body core with a carbon rod in number ten to keep the feeders open. The pouring sprue extends up through the top section.

Final Gage—The clamped stack of 13 sections is moved to the pouring area. Here the mold cavity and barrel core location are gaged with an aluminum fixture before the five mold sections are clamped in place.

After the assembly is complete, a piece of $\frac{1}{4}$-in. steel plate is placed on each of the four sides of the mold and they're banded in place. It gives additional support to the mold.

Cooling Tunnel—Metal is poured at 2870° F. When the metal has solidified, the poured molds are laid on their sides on a car conveyor that travels through a hooded, ventilated cooling tunnel for 10 hours. After this, they're transferred to a vibrating, hooded shakeout.

Clean-Up — After shakeout, the gates and risers and the large head feeder are removed by oxypropane torch. Next, the castings are suspended in an air blast cabinet. They're blasted with steel grit. Cleaning of the cavity is done with a tube which extends through the shell opening, and which moves up and down pneumatically, spraying grit against the cavity walls.

Bottom of the shell cavity is then ground with an air-driven, cone-shaped wheel. The wheel is mounted at the end of a 7-ft long handle. Next, the fins are removed by a swing grinder.

Heat Treat—Shells are put into one of four pit-type electric normalizing furnaces. Each holds five shells. Furnace temperature is brought to 1775° F and is held there for 8 hours.

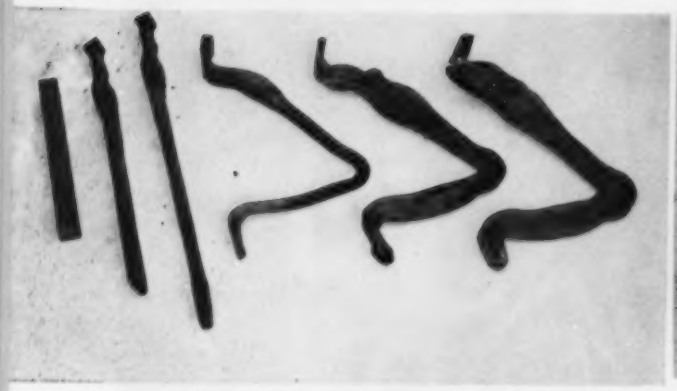
After the first step, the shells are hoisted from the furnaces, air cooled and transferred to a second group of furnaces and held at 1690° F for a little over 6 hours.

Quench—When that cycle is completed, the shells are oil quenched. They are set open end up in the empty quench tanks. A pipe is lowered into the shell cavity and the oil is turned on.

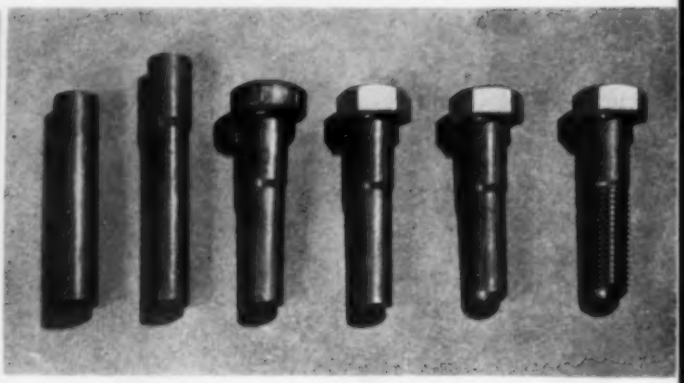
As the oil surges out of the cavity top, it strikes a metal deflector plate—mounted on the pipe slightly above the casting—and is deflected into the tank compartment around the shell.

Quenching is complete in 10 to 15 minutes. Oil is dumped from the cavity, and the shells are set in pit-type draw furnaces for a minimum of 7 hours at 1290° F.

Final foundry operations consist of cooling, blast cleaning of scale and removal of the lifting lugs and gate stubs. Finishing touches are put on in the machine shop.



This automobile brake pedal forging is elongated from initial bar stock in two rolling passes prior to finish forging on the same heat. Rolls make short runs practical



To get good physicals, blank is brought to body size, head is formed as shank is extruded to pitch diameter, head is trimmed. Bolt is pointed and threaded

Trends in Modern Forging

As a material saver, as a time saver, and as a device for actually improving product quality, forging has taken a place on the production line. Here are some of its jobs

By ROBERT G. FRIEDMAN
Vice President & Asst. General Manager
National Machinery Co.
Tiffin, O.

SPURRED on by the urgency of the jet engine program during the Korean War, the forging industry crammed a generation of new know-how into a few short years. As a result, the industry is alive with new trends.

Production speeds are getting faster. Some forgings are now combined, adding to the size and complexity of modern forged shapes. Other forgings are getting smaller, stronger and are being made faster and to closer tolerances. This is the age of "gadgets," the tremendous number of odd-shaped components which now can be forged advantageously.

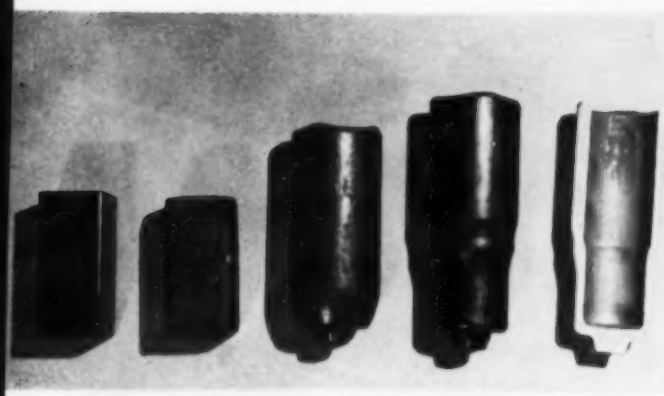
Hot Forging—A steadily growing method of inexpensively preparing forging blanks utilizes a rapid, simple rolling operation. The rectangular blank is placed between two roll dies and against a stock gage, tripping the machine automatically. In less than five seconds the average forging blank can be reduced and elongated, ready for finish forging on the same heat.

The skill, ingenuity and judgment formerly required to prepare forging blanks are now designed into the machine and dies. Properly designed guides, tongs and stock gages, working in conjuction with the automatic stock gage trip unit, assure fast, accurate feeding and exceptional blank uniformity. The method produces a clean, descaled blank. Accurate distribution of material reduces flash. Rolls are low in cost and quickly interchangeable, making short forging runs practical.

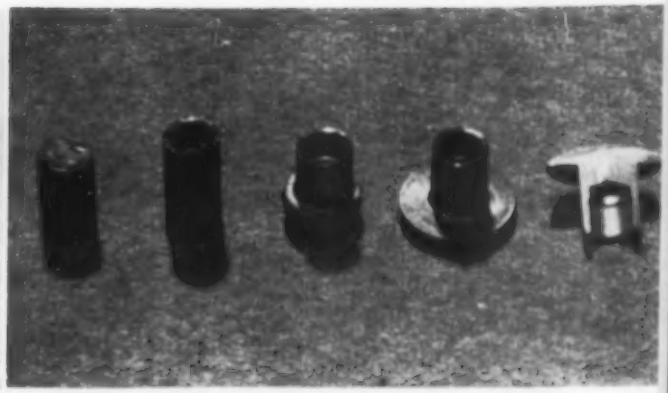
Workhorse — Press forging has now been proved on a round-the-clock production basis. The requirement of artisanship in forging has been removed and replaced by know-how in die layout and press design.

Press operators quickly become experts, and forgings are no longer scrapped for want of skill. Most press forgings are made in only two or three blows. Mechanical ejection allows the designer to reduce draft, cutting material costs and machining time.

Close Work—Because of the ability of these presses to hold concentricity and wall thickness in



Rocket heads are forged from 2¼-in. round-corner square stock at 300 an hour. Head is extruded with a heavy wall; then drawn to reduced diameter and wall on closed end



To get the tubular rivet, blank is first backward extruded (cold), material is gathered for head, and part is headed. Rivets can be run off the header at 140 a minute

extruded sections, they are being used extensively to extrude the original cups from which ordnance parts are drawn. In many cases the bottom of the shell cavity is finish forged and is not worked during subsequent drawing operations. Production often exceeds 400 pieces an hour on this work and dimensions are held within 0.015-in. total indicator runout.

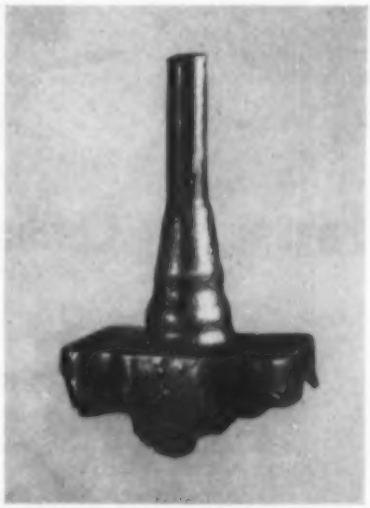
Cold Forging — Applied to smaller parts and larger quantities, cold forging is leading the way toward completely automatic forging at high speeds and with substantial material savings.

Many new jobs are switching daily from screw machines to high-speed cold forging machines. Cold nut formers, cold headers, bolt-making machines are in production on thousands of different parts. One nut former automatically produces nuts from coiled wire or rod at speeds up to 100 a minute.

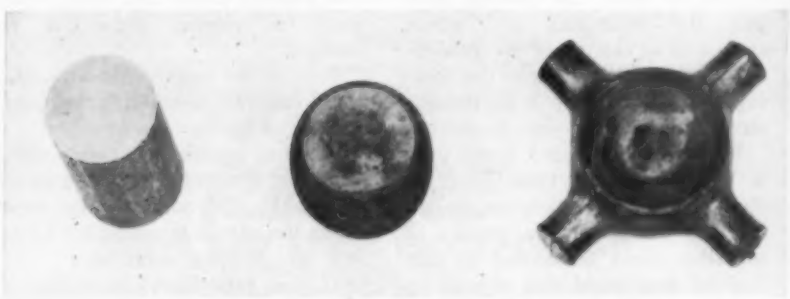
Extrusion comes into the picture as an important trend in cold forging. For example, many sizes of tubular rivets are being turned out on a high-production basis.

Formerly these parts were cold headed and then finished by drilling. Parts are of excellent quality. Time and material savings are often considerable.

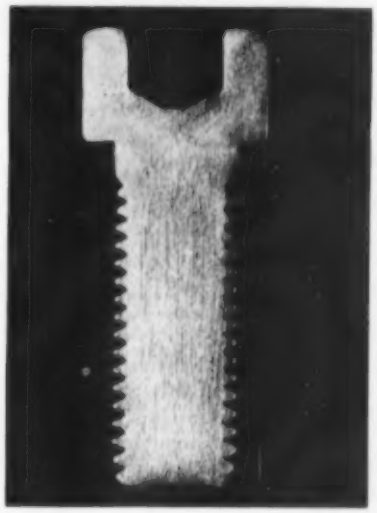
To maintain and accelerate the rate of progress in applying forging to the ultimate enhancement of our industrial accomplishment, a number of realms of endeavor deserve our further concerted attention. These include: Improvement in forgeability of raw materials, improvement in forging-die materials, improvement in forging-die lubricants, further examination of jobs which could be forged advantageously, and further application of automatic methods and equipment to work now done on forging equipment.



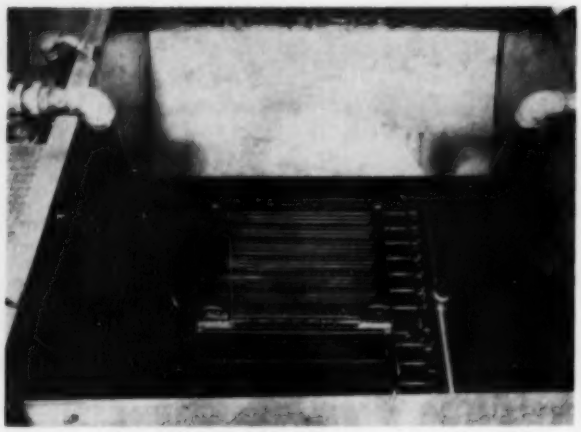
Now, hot extrusion of these wheel spindles brings a 30-per-cent material saving. Billet weight was cut 2 lb



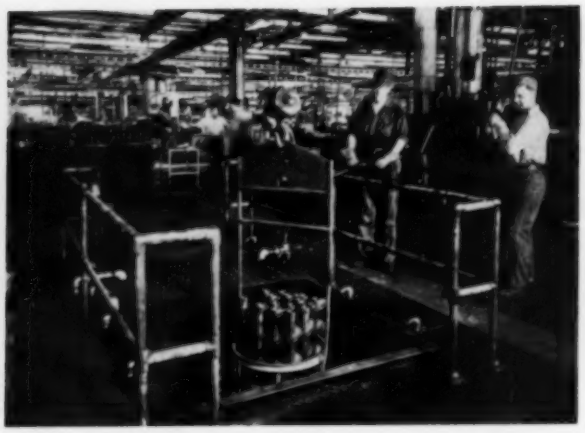
Universal joint spider is forged in two blows. Stock is 1-5/32-in. diameter, 2⅛-in. long. Die life of this job averages 7000 pieces, top tool averages 20,000 parts



Socket-head capscrews, produced at up to 110 a minute with extrusion, show good flow, no surface defects



Bank of heat transfer units in the cooling section of a quench tank at National Acme Co., Cleveland. Cold water flows through the units and cools the quench oil before it is pumped back into the quench section of the tank. Entire Platecoil bank lifts out of tank by merely disconnecting water inlet and outlet pipes



Basket of parts enters the quench pit. Behind it can be seen the screen through which quench oil overflows into cooling tank (covered with a grating). National Acme intends to equip all its quench and cooling tanks with Platecoils, and have a spare bank of them on hand to speed maintenance and increase productive time

Faster Oil Cooling Ups Quench Capacity

By adopting a new type coil for its quench oil tank, a Cleveland firm has licked its oil cooling problems, cut costs. Cooling water does double duty as hot rinse

CHEAPER, more efficient, more convenient. That's how National Acme Co., Cleveland, rates its recently adopted method of cooling quench oil.

A new type of heat transfer unit is the secret. It consists of two embossed metal sheets, welded together to form channels through which cold water is circulated. Called Platecoils, they are immersed in the quenching oil. Tranter Mfg. Inc., Lansing, Mich., makes them.

Coils in Quantity—Banks of the units are used in a two-section tank that is 11 ft deep and set into the floor with the top of the tank flush with floor level. One section is used for quenching, the other for cooling the quench oil. Twelve coil units mounted on an angle iron frame that can be pulled out of the cooling section all at once do the cooling.

Level of the oil in the cooling section is about 2 ft lower than the quenching level. The wall between them has a slope at the top to let oil flow from the quenching to the cooling section without splashing and without picking up air.

Constant Circulation—A pump at the bottom of the divided tank moves oil from the cooling tank into the quenching pit, which causes oil at the top of the quenching pit to spill down into the cooling tank, setting up a continuous circulation.

Previously, National Acme used a horizontal tube type heat exchanger through which the quench oil was pumped. The volume of oil that could be cooled in this fashion was small and slowed up quenching. In addition, maintenance was a real problem because it was difficult to pull out the tubes, they were hard to clean and leakage caused trouble.

Now there's practically no maintenance. Only two unions are required to connect the system. So far, the coils have not had to be removed from the cooling pit.

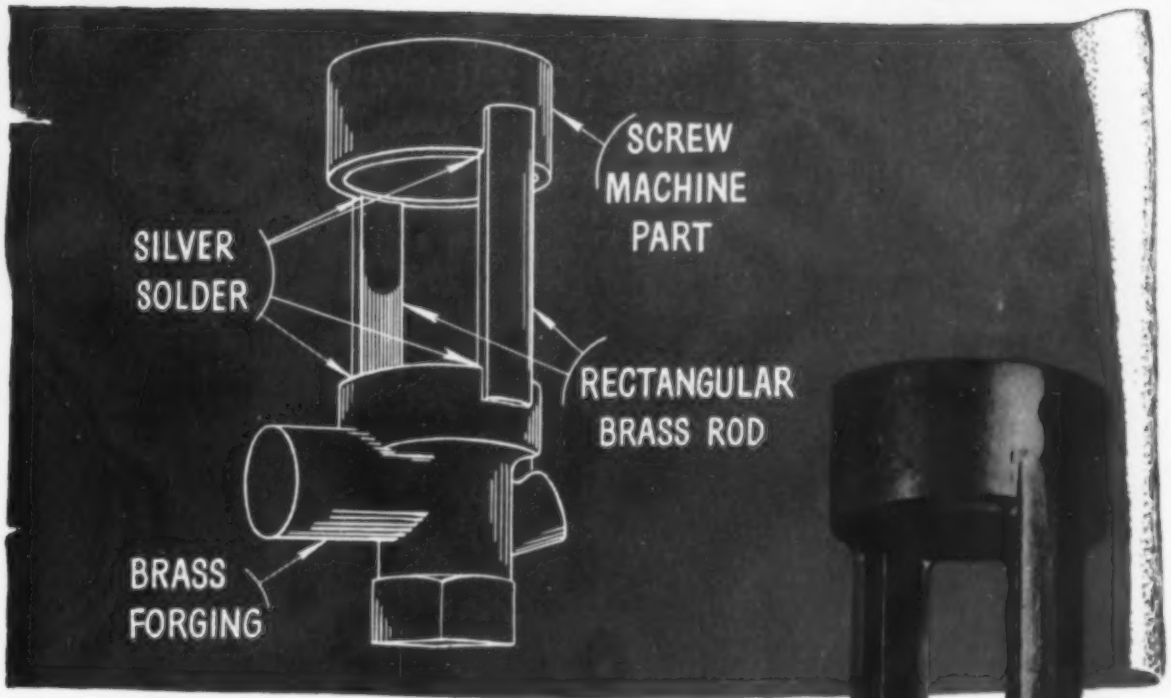
Water circulated through the coils is re-used until it reaches a temperature of about 140°F. Then it is pumped to the acid room to be used for rinsing before it is dumped.

Cost of the installation was less than that of methods previously used.

Another application being tested is for heating in an acid pickling tank. The company has been using live steam injection for heating the pickling solution.

If the experiment succeeds, it could cut water and possibly acid consumption by eliminating dilution of acid by the steam.

REVERE Brass Forging



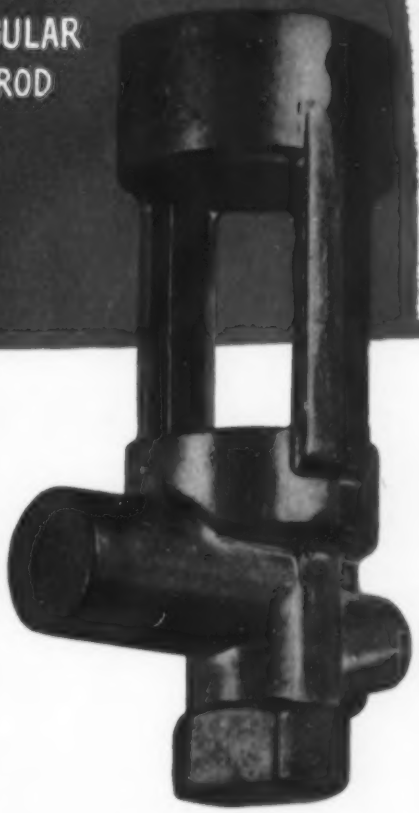
MAKES 1 PART OUT OF FOUR

. . . saves money

The one-piece brass forging shown here replaces a built-up part, formerly made of a screw-machine part, a forging, and two rectangular bars, assembled by four silver-soldered joints. The latter in turn replaced an iron casting, which was more expensive than expected, due to rejects. The part goes into a visible force-feed lubricator, which can operate at several thousand psi., and can be controlled to feed just a drop at just the right time to such equipment as compressors.

We suggest you look into forgings of copper, brass, other copper alloys, aluminum alloys. The forging process produces parts that are dense, non-porous, have many design details accurately and smoothly executed, require a minimum of machining. Revere knows a great deal about the forging of non-ferrous metals. In the case shown here, we collaborated closely with the customer in designing the part so it could be forged in one piece instead of being assembled out of four different items. The result is a better part, and appreciable economies.

For information about forgings, see the nearest Revere Sales Office.



Partially-machined brass forging for sight feed of force-feed lubricator.

At top, drawing showing how this part formerly was assembled out of four different pieces.

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Operators Concentrate On Costs

New processes and improvements to old get scrutinized closely by AISE convention-goers. "Can they cut my costs?" is chief concern

NEWCOMERS on the American steelmaking scene — the oxygen converter and continuous casting— drew the most attention at the convention of the Association of Iron and Steel Engineers in Cleveland. This despite a 48-paper technical session loaded with cost-cutting operating ideas.

It's the old story of the new being more exciting than improvements to the old. Interest in both newcomers is especially high now, with Atlas Steel Ltd. successfully casting stainless on their continuous machine, and a couple of steelmaking plants about to make the first oxygen conversion steel on this side of the Atlantic.

Abstracts of many of the papers appeared in the Sept. 20 issue of STEEL. Highlights of others are presented here:

Economic Aspects of the Oxygen Process, by W. C. Rueckel, vice president, and J. W. Irvin, associate engineer, Kaiser Engineers, Division of Henry J. Kaiser Co., Oakland, Calif.

Production cycle of a 35-ton oxygen converter is about 40 minutes —20 minutes blowing and 20 minutes idle. Idle time is consumed in skimming, testing, pouring and charging. The production rate of an oxygen converter is 52 tons an hour or 450,000 tons a year.

A second converter could be installed, having its production cycle staggered so that it would be blowing while the first converter was idle. This procedure would double capacity of the plant without materially increasing the size or quantity of auxiliary equipment, other than the oxygen plant.

Correspondingly, the production rate of a modern open-hearth furnace using hot metal is about 21 tons an hour. On the basis of 90 per cent furnace availability, the best production rate is 18 tons an hour or 160,000 tons a year.

The wide variation in costs for an oxygen converter shop and the open-hearth shop lie chiefly in building and in the equipment. In view of the small size of the oxygen converter compared to the open-hearth, less building area is required. In addition, lighter live and dead loads result in less expensive columns, beams and floors, reducing the cost per unit area.

Equipment costs are lower for an oxygen converter shop: 1. Because of the lower cost of the metal as compared to three open-hearth furnaces. 2. Because of the lighter cranes and other auxiliary equipment.

Continuous Drawing of Cold Finished Bars, by W. J. Prochak, assistant superintendent, Cold Drawn Bar Dept., Youngstown Sheet & Tube Co., Youngstown. A new method allows the processing of coils in groups. Under the old method (individual coils were handled at several processing stages), about 3 ft were scrapped from the front end of each coil because of the point; and about 10 to 14 ft from the back end of each coil were scrapped due to the whipping and marring action of the coil as it left the bull block.

Electrical and mechanical maintenance time has been reduced. Repairs on jib cranes were eliminated. The new method resulted in less wear on the block drum and mechanical maintenance on straightening and cut-off machine.

The safety hazards have been practically eliminated. Minimizing the number of individual operations, which reduced individual handling, greatly lowered the number of hazards of processing. Finally, the operating crew was reduced about 40 per cent.

Some Aspects of Open-Hearth Waste-Gas Analysis Control, by F. P. Hubbell, superintendent, Fuel Dept., Homestead District Works, United States Steel Corp., Munhall, Pa.—Experience has indicated that the waste-gas analysis control applied to an open-hearth furnace cannot give the type of control normally expected in the control of temperature, flow, pressure, etc. Many disturbing and constantly changing factors are present during the operation of an open-hearth furnace, which makes precise control of waste-gas analysis practically impossible.

(*Please turn to p.* 125)

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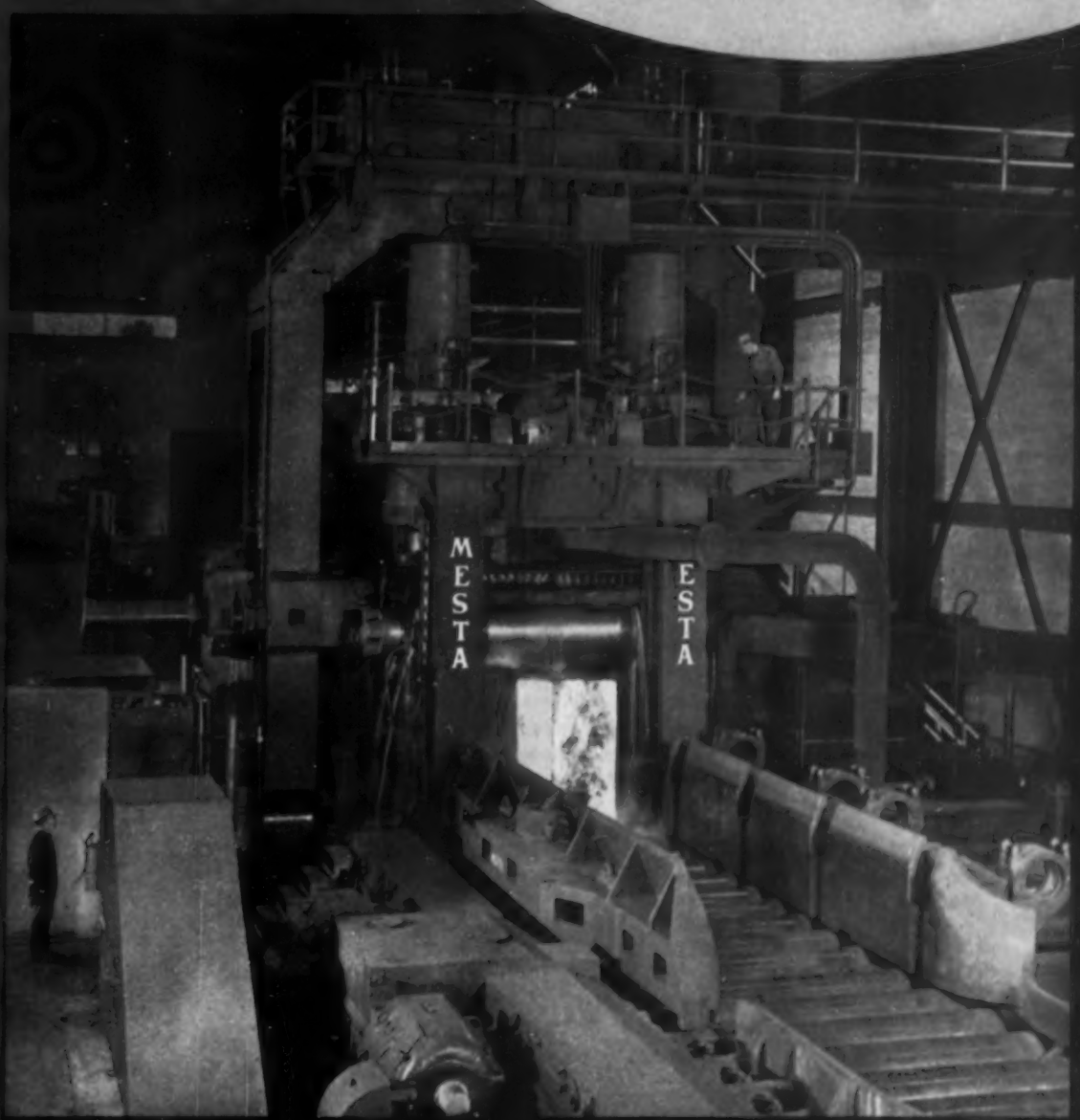
Rolling 20 Ton Ingots into slabs on a Mesta 45"x 90" Universal Reversing Slabbing Mill



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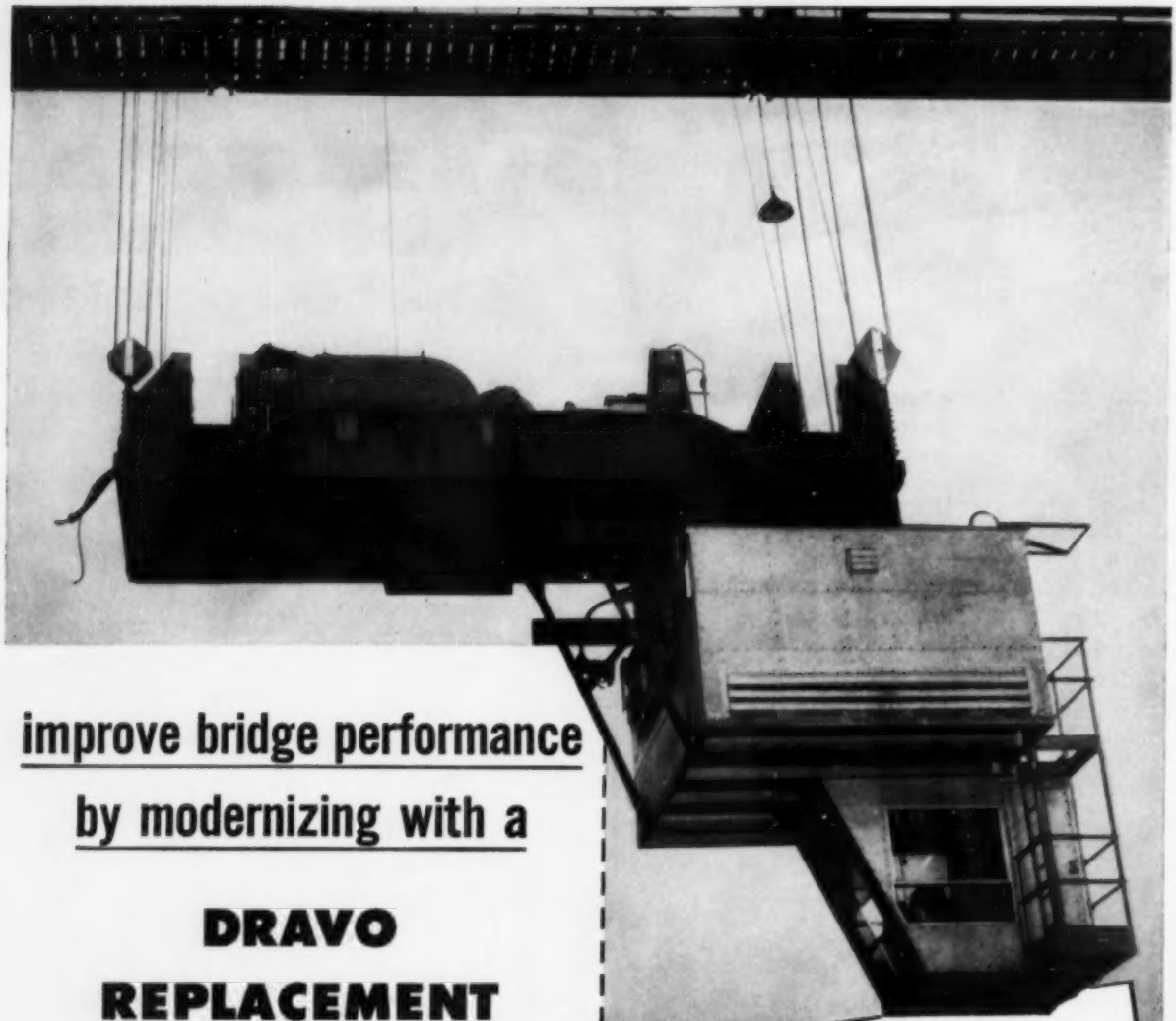

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PROGRESS. . .

(*Continued from p. 122*)

Use of this waste-gas analysis control has indicated that combustion air flow required during all stages of a heat generally are higher than those determined by spot Orsat analysis tests.

For all furnace campaigns where the control was used, a substantial improvement in roof life occurred. This is believed to be a direct result of higher combustion-air usage during the bath reaction, as dictated by the waste-gas-analysis control.

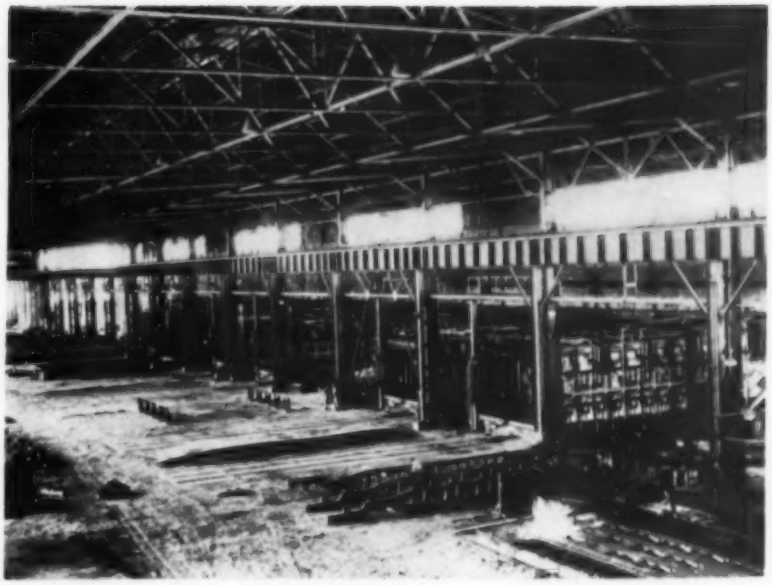
If sufficient air is made available at all times to maintain an oxidizing atmosphere in contact with silica brick, at the elevated temperatures encountered in an open-hearth furnace roof, refractory life is substantially improved beyond that obtained when heavy reducing atmosphere conditions exist.

A continuous waste-gas-analysis control will function within certain limits and is useful for the determination of open-hearth combustion practices. But, if a control of this type is applied to one typical furnace in an open-hearth shop, much useful information can be obtained, which will assist materially in establishing sound combustion practices.

Pinholes in Thin Steel and Pinhole Detecting Apparatus, by G. H. Rendel, research associate, Research and Development Laboratory, United States Steel Corp., Pittsburgh — The previously accepted rule of thumb that a satisfactory pinhole detector should be capable of detecting perforations half as large in diameter as a strip thickness has been outmoded. With the latest detectors, a relationship of detectable-hole diameter to strip thickness of about 1:15 or 1:20 appears to be approaching a reality.

From the earliest to the most recent models, the rated detectable-hole size has been reduced from 0.015 to 0.001-in. diameter. This represents a reduction of 15 times in diameter and 225 times in area.

Probably the most common factors contributing to unsatisfactory performance on good pinhole detectors are vibration, dirt and faulty shielding from other electrical apparatus or extraneous light. A satisfactory light shield should be capable of following all changes in the sheet pass line, and should be isolated from the scanner to prevent transmission of vibration to the scanner. Development of a satisfactory light shield is urgently needed.



Gas-Fired Ovens Heat Steel Plates up to 60 Feet Long

The heat treating process facilities at Lukens Steel Co. have been increased to allow for heat treating, quenching and drawing plates up to 60 ft long. In addition to carbon and low-alloy steels, special alloys such as Inconel are being processed with the augmented equipment which ties in with their facilities for rolling wide, thick and heavy steel plates. This is the battery of gas-fired furnaces which are used to stress-relieve, anneal, normalize, harden and temper steel plates, in addition to plating shapes and weldments

Modern Techniques of Lubrication Applied to Old Mill Equipment, by E. G. Weimer, superintendent, Primary Mills Maintenance, United States Steel Corp., Youngstown, O.—To get immediate results and to reduce one of the major sources of maintenance delay and replacement costs, the 43-in. blooming mill pinions were selected as the first installation in this program. Minor design changes were necessary in the bearing box, and the two-piece pinion housing required remodeling to stimulate one-piece housing with bath-type tooth lubrication.

Working closely with designers of automatic lubrication systems in search for better ways of lubricating heavy equipment, the spray nozzle method of applying lubricants by injection through an air stream was developed. An assembly was built up and installed on the 15-in. continuous mill main drive gearing.

Automation in lubrication plays a vital role in decreasing maintenance costs and reducing operating maintenance mill delays; it also is felt that, by removing maintenance personnel from the hazardous positions necessary to lubricate the rolling equipment, automation has helped to achieve the low accident rate we now enjoy.

Cold Roll Forming by E. J. Vanderploeg, chief engineer, Yoder Co., Cleveland—Because automation is becoming more and more necessary to produce parts more economically and more accurately, roll forming equipment is being combined with other equipment to manufacture parts completely with a minimum of handling. Most important and most commonly used is some type of flying cut-off machine to cut off the shape after it is formed in the roll forming machine.

To further increase production and efficiency of cold roll forming equipment, supplementary equip-

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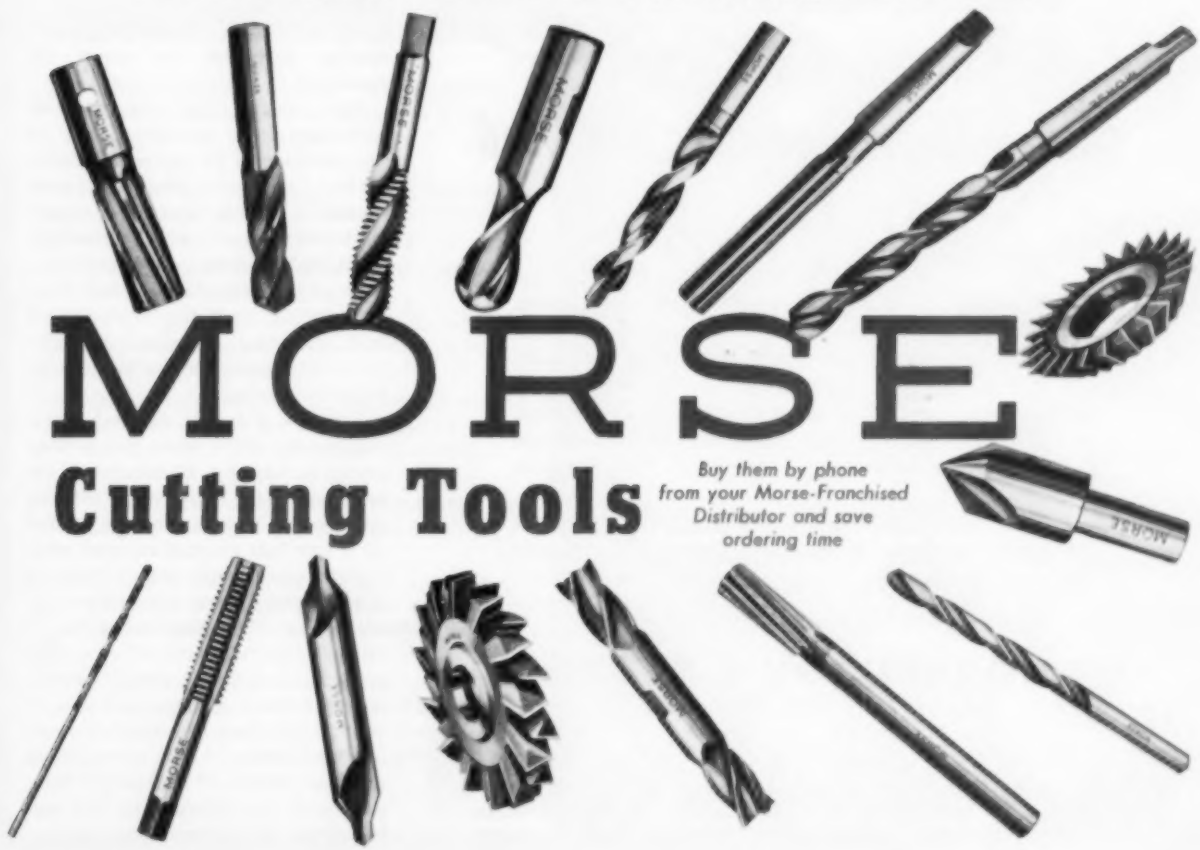

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Cutting Tools

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ment is often used. Where maximum production is of extreme importance, buttwelders combined with looping arrangements are used.

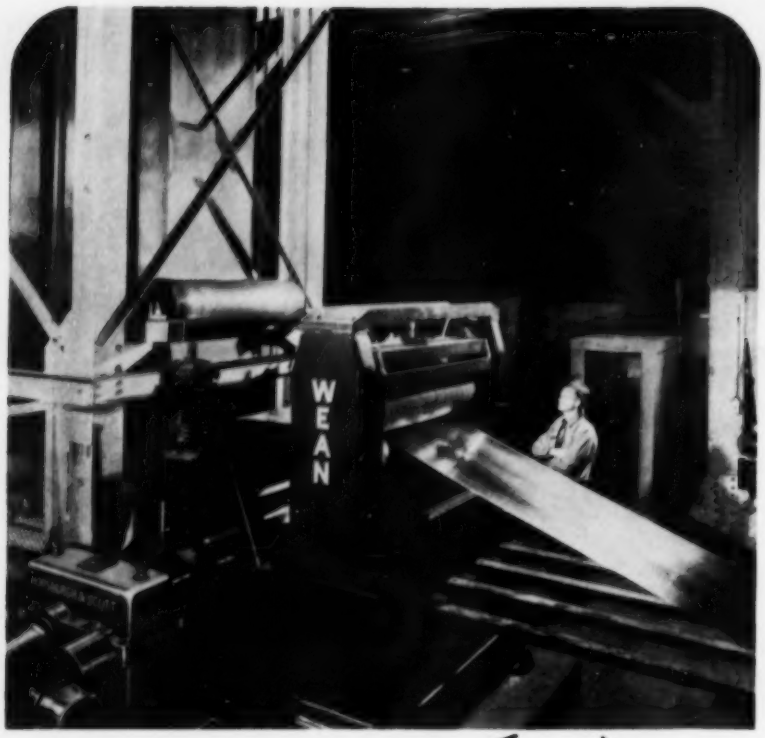
Rolls of cold rolling equipment are made from a number of materials, depending on their use. When roll forming unpickled hot rolled steel, high carbon, high chrome roll material is used because of its resistance to abrasion. Cast iron and soft machine steel are used for spacer rolls and forming light gage shapes.

The ground finish is generally suitable for forming hot or cold roll steel sheets, but highly polished rolls are necessary for forming stainless steel and enameled or coated stock. Chrome plated rolls often are furnished for forming highly polished or coated material.

Continuous Batch Type Annealing Furnace, by R. H. Gelder, works metallurgist, and Walter E. Hand, supervising metallurgist, Ashland Works, Armco Steel Corp., Ashland, Ky.—The Ashland Works has performed the bulk of its sheet and plate box annealing in continuous, car bottom, tunnel type annealing furnaces for about 30 years.

The satisfaction experienced with this type equipment led to the adoption of an improved model of such a furnace when increased tonnages of a special product made an expansion of annealing facilities mandatory. The performance of this new furnace has been outstanding from the viewpoint of fuel economy, production rate, versatility and preciseness of temperature control.

Furnace is in the general shape of a tunnel, 12 ft wide, the bottom being formed by 12 insulated car bottoms, each 16 ft long. Sheets or plates to be annealed are loaded on a car bottom and covered with a light plate cover, which rests in a sand seal around the outer edge of the car. As the loaded car is pushed into one end of the furnace by a pusher carried by the transfer lorry, an annealed load is discharged from the opposite end of the furnace. Interval between charges is fixed so that proper temperatures are obtained by the material for the desired anneal.



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H & S Speed Reducers Are Used

The above illustration shows an H & S reducer driving the main pulling bridle in a Wean continuous tower type annealing line for tin plate at a large steel corporation. It replaces the batch annealing process and produces a much more uniform product . . . with a great saving in floor space. H & S reducers were selected for their excellent construction and reliability (*freedom from down time*).

This is only one instance where H & S is helping industry do a better job . . . our engineering department is always at your service.

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A Mechanical Eye to Watch Your Tools

Cross Machine Control Units Reduce Downtime and Tool Costs

(U.S. Patent Nos. 2679038 and D-163935. Others Pending.)

The Machine Control Unit was originated by Cross to solve tool changing and down-time problems in machines with multiple tooling.

Available for drilling, milling, boring, turning and similar machines, the Control Unit provides many benefits:

- ★ It reduces tool expense by minimizing breakage and grinding.
- ★ It is equipped with Toolometers which automatically stop the machine when tools need changing.
- ★ Other tools indicated by the Toolometers as *almost* used up are replaced at the same time. This grouping of changes drastically reduces downtime.
- ★ Pre-set tools are stored in the Machine Control Unit for instant availability at the machine.
- ★ Standard fixtures and gages are provided for pre-setting the tools to eliminate downtime for machine adjustments and trial cuts.

Over 300 Cross Machine Control Units are now successfully reducing manufacturing costs in plants throughout the country. It will pay you to write, wire or phone for full information *today*.

Master tool setting fixtures and two standard types of gages for pre-setting tools.

Established 1898

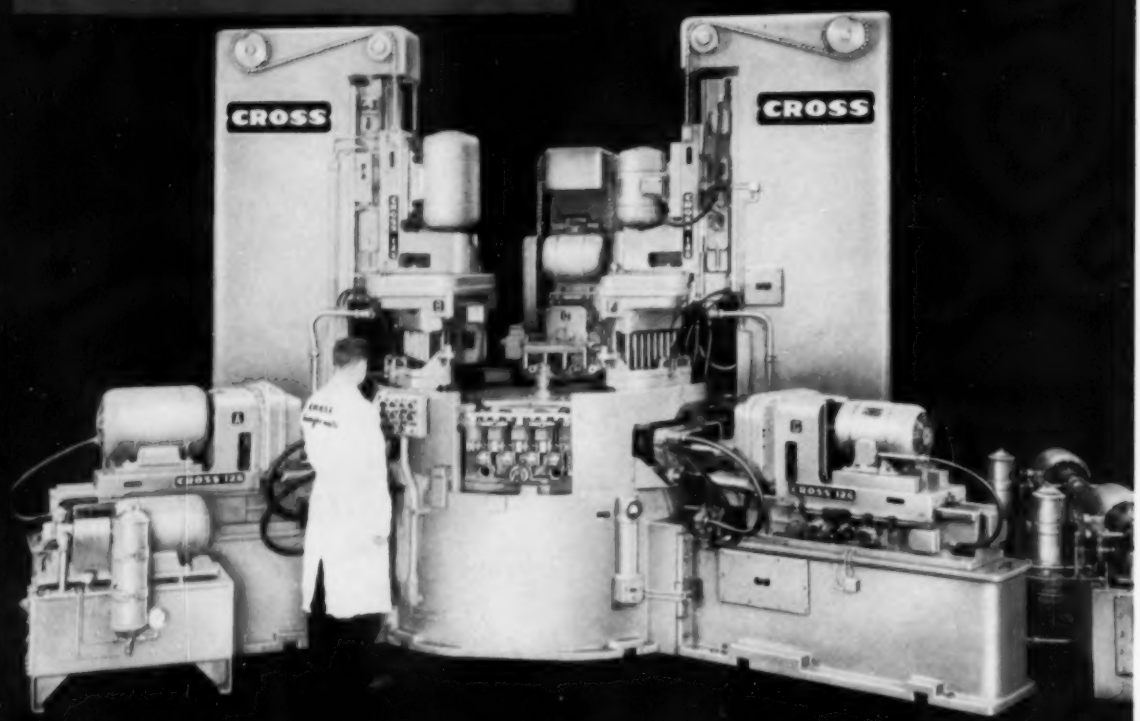
THE CROSS CO.

DETROIT 7, MICHIGAN

Special MACHINE TOOLS

Drills, Reams, Chamfers, and Mills Connecting Rods

Another Special by Cross



- ★ 450 pieces per hour at 100% efficiency.
- ★ 6 stations: 1 for loading, 2 for drilling, 1 for chamfering, 1 for milling, and 1 for reaming.
- ★ Drills, reams and chamfers bolt holes; drills, reams and chamfers piston pin hole; and mills lock slot.
- ★ Fluid motor driven index table.
- ★ Hydraulic power clamping for work holding fixtures.
- ★ Other features: Hardened and ground ways; coolant system; hydraulic feed and rapid traverse; construction to J.I.C. standards.

Established 1898

THE CROSS CO.

DETROIT 7, MICHIGAN

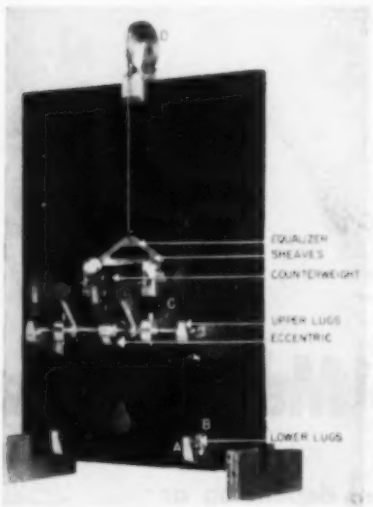
Special MACHINE TOOLS

New Open-Hearth Door

Locking device prevents leaking around edges of conventional furnace doors.

LEAKAGE around the edges of open-hearth and heating furnace doors has been abated by a simple self-locking mechanism developed by Jay J. Seaver Engineers, Chicago. The device locks and unlocks conventional furnace door.

Two studs, "A," are welded to the bottom edges of the door (see photo). They fit into 60-degree angular lower lugs, "B," welded to the door frame. Above are two slotted bearings, "C," welded to the back of the door. These carry



LEAKPROOF DOOR
. . . mechanism pushes to seal

a shaft supported at the ends by upper lugs. At the center of the shaft is an eccentric and two counterweighted arms, the latter being connected to the equalizer by individual chains that operate under sheaves anchored at the top of the door.

Operation—Centered at the top of the door is a sheave, "D," over which operates a cable leading to the usual motor-driven operating rig. When the door is being opened, the cable pulls the counterweighted arms up to the sheaves, causing the shaft to release the eccentric pressure against the door. The top of the door leans outward momentarily, breaking the seal; it then is lifted vertically to the opened position.

When the door is to be shut, the electric rigs move it downward, and while in transit, the lower studs, "A," drop into lugs, "B," until snug. Meanwhile, the upper shaft has been positioned in the upper lugs. As the door continues on its downward course, the counterweights actuate the eccentric that pushes against the upper part of the door, causing it to make a tight seal with the furnace door frame.

The installation is at Pittsburgh Crucible Steel Co., Midland, Pa.

Laboratory Guide

A book aimed to be of assistance in planning experimental procedures and to explain laboratory techniques in dealing with metals is *Procedures in Experimental Metallurgy* by A. U. Seybolt, Ph.D., and J. E. Burke, Ph.D.

Publisher is John Wiley & Sons Inc., 440 Fourth Ave., New York 16. Book is available from them or may also be had by writing to STEEL, Penton Bldg., Cleveland 13. Price is $7.00.

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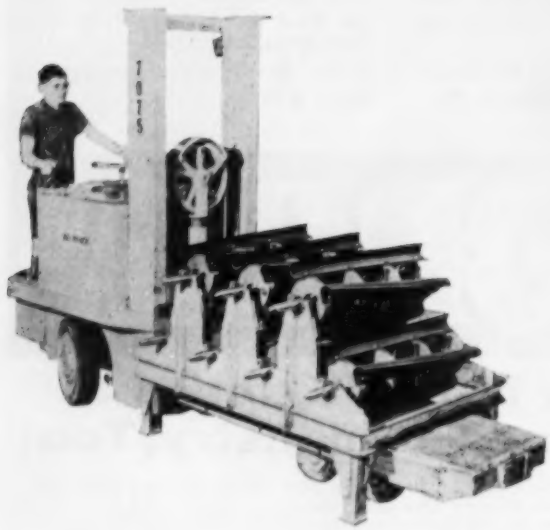
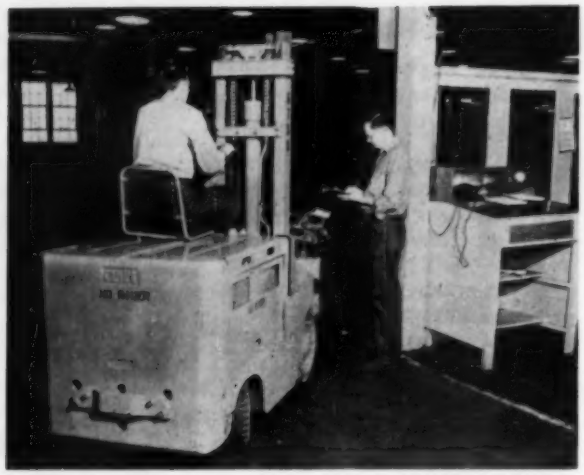




Loads carried by the interdepartmental trucks are logged at each of the four material stations by route clerks

Integrate Battery Maintenance

With production in its big LaPorte plant depending on smooth truck performance, Allis-Chalmers makes sure battery-powered units get top maintenance effort

INTEGRATION is a primary factor when industrial trucks are used for interdepartmental handling in an operation as big as Allis-Chalmers' 1.8 million sq ft LaPorte works. It's equally important to extend the practice to maintenance of handling equipment.

The truck fleet of the farm harvester manufacturer numbers about 100 units — 54 battery-powered walkies on repetitive jobs, about 46 battery and gas-powered in interdepartmental service.

Organization—The setup for moving materials through receiving, storage and assembly is similar to that used in many other large installations. Four material stations are dispatch points for the rider-type trucks to pick and drop interdepartmental loads. The larger trucks range through the entire plant, covering 400 to 1000 feet.

From 10 to 14 trucks work out of each dispatching station. They handle about 1000 loads a day, under direction of a supervisor and a router in each station. Tying the operation together, all trucks are under supervision of a general material handling foreman.

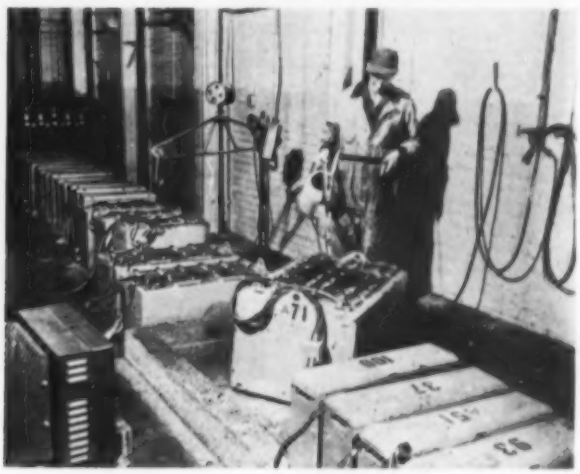
Keep 'em Rolling—Since about 23 of the 46 rider trucks (plus the 54 walkies) are battery-powered, maintenance of the batteries is a vital continuing project. Charging is done in two stations, designated north and south. The former is equipped to recharge 12 of the smaller 12-v, 6-cell batteries and 11 of the larger 36-v, 18-cell units. Five motor generators furnish power for charging by modified constant voltage with a terminal voltage relay.

The south station has 16 circuits for small batteries, nine for the larger type. Six motor-generator sets and one rectifier supply power. Both stations are enclosed by wire

Repetitive interdepartmental handling is done by a fleet of 54 battery-powered hand trucks at Allis Chalmers

Charging stations are separated from main plant, motor-generators are raised to gain space for battery handling

with Production



Batteries are washed in charging station sink. Regular practice calls for neutralizer, followed by water wash

partitions to keep out unauthorized personnel and protect traffic against accidental contact with circuits.

Charging Practice — One attendant works the first shift and covers both charging stations. When trucks come off duty, he hooks on the charging cable, a job drivers are not permitted to do. When possible, batteries are charged in the trucks.

Most battery maintenance work is done by one man on the second shift. A third attendant spends only part of his time in the battery rooms on the third shift. Charging and maintenance, plus truck maintenance and repair, are directed by maintenance foreman.

Present practice calls for two batteries for each truck. This permits an equalizing charge for each battery every five days, following a program suggested by a Gould field engineer. It's a profitable arrangement, according to Allis-Chalmers maintenance men. Many batteries have been in service 5 years and a life expectancy of 6 to 6½ years is anticipated.

Battery Handling — Although most batteries are charged in the trucks, it's necessary to remove them for washing, equalizing charge or special maintenance work. For this job, A-C designed a strong but compact spreader bar to simplify the work and prevent damage.

With a little juggling, the company gets the last hour of useful life from its batteries. When a unit can no longer power a truck for a full shift, it's given a full charge, an equalizing charge and a test discharge to determine capacity. If condition warrants, specific gravity is brought up to required value and battery placed in light duty service until useful life is exhausted.

Logan Triple-Deck Roller Conveyors handle air compressor units to and from preliminary test operations in nationally-known air brake concern. Units are dispatched to subsequent tests via upper deck.

American Industry—"Links all plant facilities into one productive unit"

Tying-in all plant operations to make one efficient whole . . . is an American industrial ideal, resulting in lower costs, greater production.

And handling equipment, like Logan Conveyors, is a major factor in reaching this ideal. Conveyors link up separate plant buildings, make three or four story plants the same as one story, tie-in all operations from receiving through manufacture, assembly, warehousing, and shipping. It's the American way.

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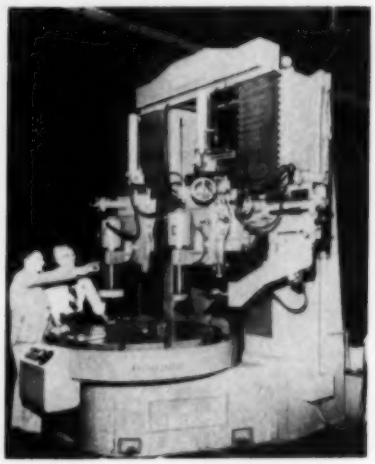
LOGAN CO., 535 CABEL ST., LOUISVILLE, KY.

Grinder Solves Hub Job

Specially designed machine features individual power units. Works hubs in vertical position

A DOUBLE SPINDLE, vertical grinder facilitates grinding of blade retention raceways in Turbo-Hydromatic propeller hubs at Hamilton-Standard Division, United Aircraft Corp. Weight and mass of the hub and fixture render conventional grinding equipment inadequate.

The grinder readily obtains accuracies of diameter, vertical center distance and concentricity within 0.00020. Hydraulically actuated



VERTICAL GRINDER
. . . works raceways in propeller hubs

contour forming wheel dressers and a turret stop device to control raceway positioning are included in the equipment designed for this application.

Drive — The floor-mounted machine was designed by Frauenthal Division, Kaydon Engineering Corp. It features individual power units. A dc variable speed motor drives the rotary table. Its controls are located in the main control station at front of machine.

Power transmittal is by timing belt drive from the dc motor to the table spindle unit. This unit has an integral bearing pulley assembly carrying the radial thrust of the drive. Grinding spindles are directly connected with reversing control and interlocks to the rail elevating controls. All compound movements are by hydraulic actuation.

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- **HIGH STRENGTH**
- **RESISTANCE TO CORROSION**
- **GOOD FORMABILITY**
- **RESISTANCE TO ABRASION**

J&L STEEL

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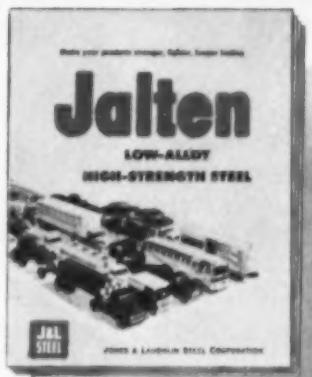
STEEL CORPORATION — *Pittsburgh*



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Make Die Life Consistent

INCONSISTENT die life is costly. When you total replacement and lost production costs, the money you spend on research to pin down cause and develop a cure usually is insignificant.

Experience of people in Inland Steel Co.'s railway accessory department bears this out. Frequent short life of dies to make railway spikes brought Inland engineers, tool steel suppliers and Lindberg Steel Treating Co. to bear on the problem.

Cause and Effect—Their early attempts at correction pointed up the fact that dies were made from bar stock in a way that grain flow was parallel to direction of the principal applied stress. They also found another contributor to poor life: The chief stress was directed against the metallurgical center of the bar.

They corrected both faults by taking a wider bar and machining dies transversely but life fell short of what was wanted. Heat checking, which eventually led to complete breakage, established a network of cracks that acted as notches, promoting rapid falure.

Carburizing — They needed a tough core and a hard case—the latter for compressive stresses on the surface that tend to minimize propagation of the heat after they form. So they carburized the dies.

Treatment developed involved pack carburizing in charcoal at a temperature of 1850°F. A case depth of 0.032 to 0.045-in. was produced. Next came oil quench and triple temper to 58 to 60 Rockwell C on the case. Blasting with sand or steel grit followed.

Bolster Milling Speed, Cutter Life

ANYTIME you can squeeze five operations into one you're saving money. Fred N. Wells Inc., Los Angeles, did it on milling offsets in aircraft spars.

The job, (2¼ x 3 x 156-in. offsets) is done in one pass with tungsten carbide-tipped inserted blades. High-speed steel cutters took five passes to do the work.

They do the hogging cut on two SAE 4140 steel bars at one time, using left and right-hand cutters on an old model 20-hp Ingersoll double-side head planer mill. To get higher operating speed for more efficient carbide cutter use, they installed roller bearings in each side head-spindle. Before offset milling, sides of each bar are face milled to remove adhering forging scale.

Production Time—Milling time for two bars was 20 hours. The 6-in.-diameter high-speed shell mills ran at 2.5 ipm, 44 rpm, taking ½ x 3-in. cut. Now it's done in 3 hours. They're using 5-in.-diameter left and right-hand step mills, each having four brazed inserted blades. The blades are carbide-tipped with K2S Kennametal 3/16 x ½ x ¾-in. long.

All blades have a 7-degree negative radial rake; a 10-degree positive axial rake on blades one and three; and a 10-degree negative axial rake on two and four. Each takes a proportionate amount of the 2¼-in.-wide cut at 1⅛ ipm and 160 rpm. Chipload is 0.007-in. per tooth; depth of cut, 3 in.

Finished Length—Climb milling is used to within 3 in. of the bar ends. Ends then are cut off. Enough surplus length permits sawing bar stock to finished length. This method is used because the old machine has no backlash control on its feed gear.

Each high-speed steel cutter required three regrinds to mill one piece. Cost was $30. The carbide cutters mill two bars before reconditioning. It takes only 30 minutes per cutter to regrind the removable blades on a conventional off-hand grinder.

What an Industrial

CASE HISTORY No. 1

A Canadian plant* making an aluminum bomb nose on a turret lathe was able to get only one part per tool grind on the form tool. A heavy cut was being taken and a good finish required. We recommended SuperKool 1-M Cutting Oil. A cutter is now lasting one and one half shifts and giving approximately 200 pieces per grind.

CASE HISTORY No. 2

A midwestern company* machining 6150 steel forgings ran out of Dasco Super Soluble Base Oil and substituted a local product. Speed had to be immediately reduced as much as possible and lighter cuts taken. However, the tool still heated up and chips continued to come off blue. Dasco Super Soluble was reordered and once again chips came off bright, speeds were high and heavier cuts are again possible.

CASE HISTORY No. 3

A Canadian manufacturer* of paint trays for roller type paint applicators was applying drawing compound to the die after every other paint tray formed. Of light gauge tin plate (.015) the trays are formed in one drawing operation. Dasco No. 26 Drawing Compound was recommended. Consumption has been cut in half with Dasco No. 26 being applied after every fourth piece.

CASE HISTORY No. 4

Three large automotive plants* now use Stuart's Sturaco L-30 E.P. Slide and Way Lubricant for lubrication of machine tool gear drive units, lead screws and heavily loaded slides and ways. Sturaco L-30 has an extra high load carrying characteristic due to the addition of extreme pressure type additive materials and it has improved adhesive qualities.

*Names will be supplied upon request.

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Lubrication Analysis can do for your Shop...

● Have you ever ANALYZED the efficiency of your shop? Perhaps production is now satisfactory . . . but we're talking about *efficiency.* What about tool life, fine surface finishes, down time on machines? These efficiency factors and many others are all affected by the industrial lubricants you use.

More than a "coolant" is needed to properly eliminate scuffing of the tool and workpiece, to reduce frictional wear and provide high anti-weld characteristics that prevent metallic seizure. "The Man in the Barrel", your Stuart representative, can help to solve these lubrication problems . . . and supply the proper industrial lubricant to provide superior lubricity, temperature control and chemical action.

The D. A. Stuart Oil Company's modern laboratory is constantly at work analyzing industrial lubrication problems such as you may be experiencing. They know how to develop the industrial lubricant that is *just right for your job!* Have your shop analyzed now... call "the Man in the Barrel". With 90 years of specialized company experience behind him, he's your best guide to greater efficiency.

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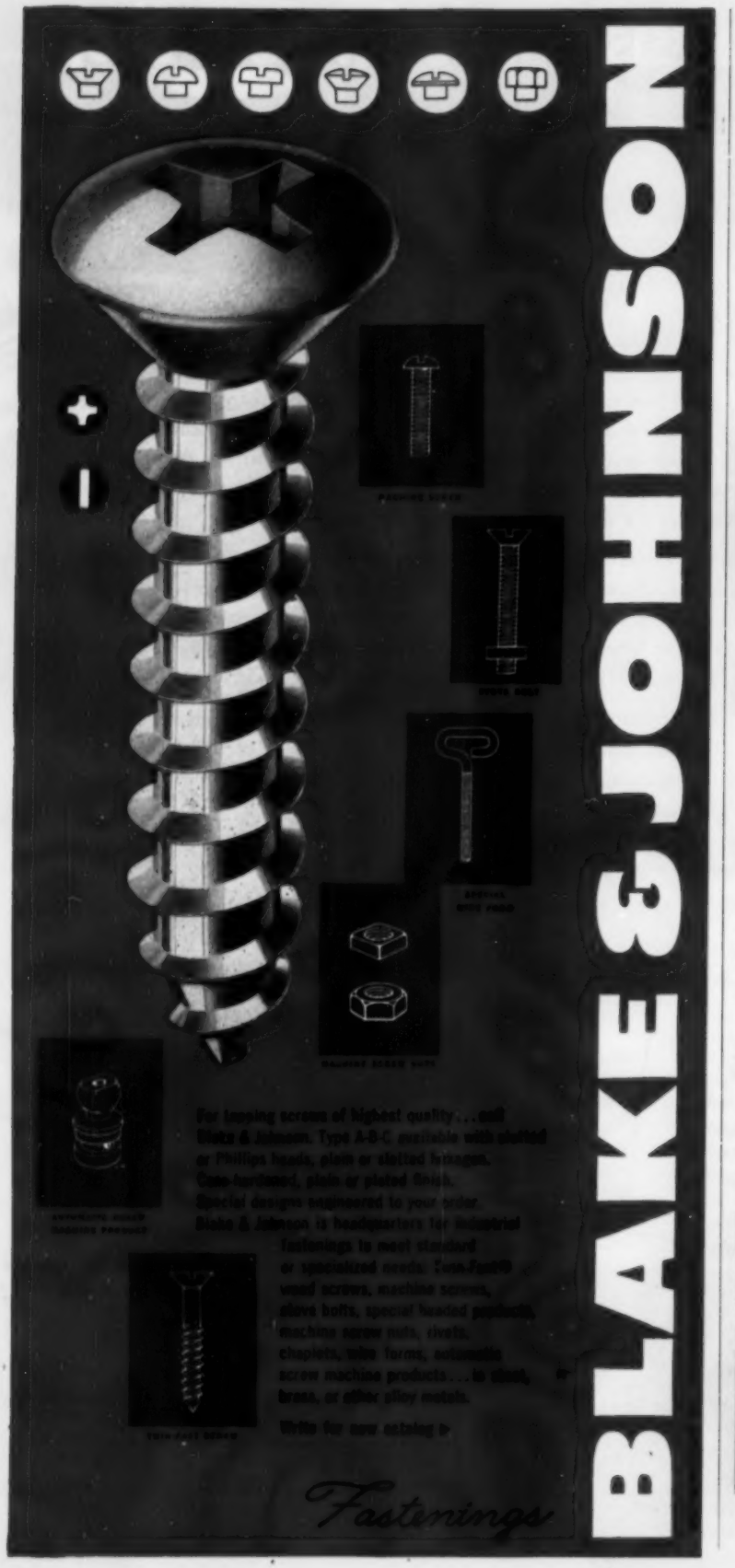
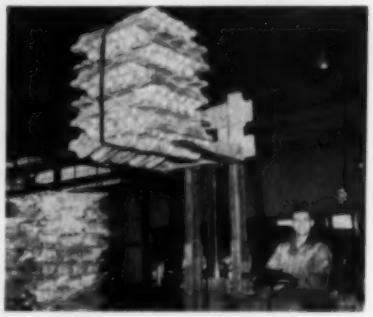


Ingot Handling

Interlocking ingot bundles are not easily disarranged or broken. Storage is no problem

AN INTERLOCKING aluminum ingot simplifies unloading and storage.

The ingot, a product of Reynolds Metals Co., can be handled without pallets and can be double or triple stacked safely and easily. Bundles of the ingots have been dropped to a plant floor from the full height of a lift truck and still remain intact. The possibility of



INTERLOCKING INGOTS
. . . lifted to full height of truck

broken and disarranged bundles after long truck or freight hauls will be virtually removed.

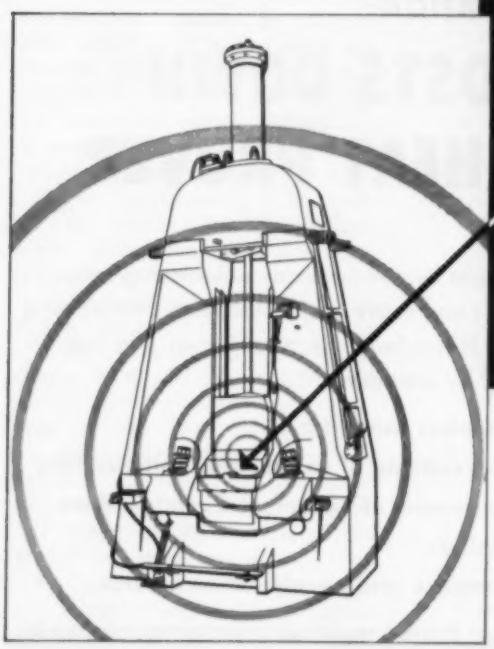
Other Pluses—In addition, it is said that the ingots' greater surface area makes them melt faster, with less gas. Also, a smoother top surface eliminates chances of trapped moisture and dirt. A metallurgical refinement is claimed since a quicker chill gives smaller grain size.

The product is available as primary or casting alloy ingots. Primary ingots have purity up to 99.9 per cent, where desired.

DROPPED BUNDLES
. . . remain secure

CECO-DROP'S LOW CENTER OF GRAVITY ASSURES AGAINST MIS-MATCHED FORGINGS

The center of gravity of the CECO-DROP approximates the center of gravity of the ram at the point of impact, minimizing the fight between the ram and the other parts of the hammer. This gives a more effective blow, preserves die



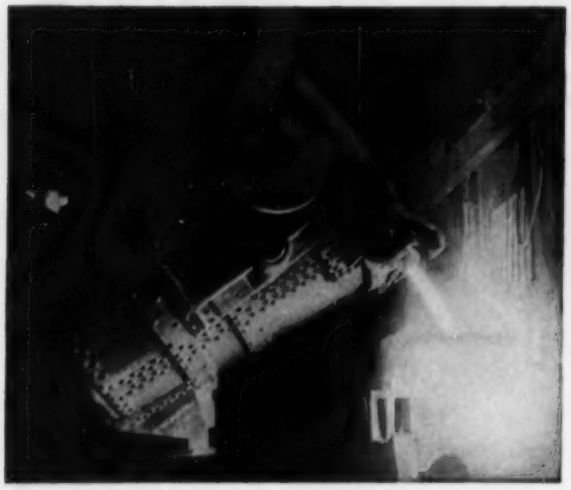
alignment, which assures fewer rejects, and results in higher production in comparison with other types of hammers.

Write for a copy of Bulletin 57-L-4

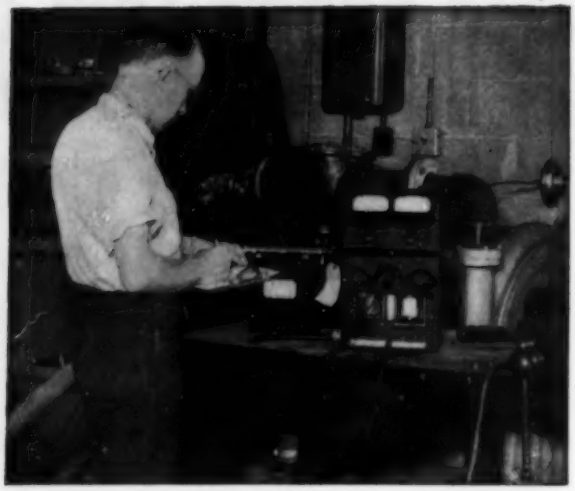
CECO-DROP

Made by the BUILDERS of THE IMPACTER

CHAMBERSBURG ENGINEERING CO., CHAMBERSBURG, PA.



STEEL OUTPUT INCREASED BY 110 TONS PER DAY REPORTS STEEL PRODUCER: Tap-to-tap time reduced from 18 to 12 hours . . . Fuel cut 46% per ton produced . . . Tonnage up 50% daily! That's the job Cities Service Heat Prover helped perform for one of the largest steel producers.



"COMPLETED 30 HOUR TEST IN JUST 6 HOURS!" "We completed what normally would have been a 30 hour test in just 6 hours," writes the Eclipse Fuel Engineering Co. of Rockford, Ill. "We found the Heat Prover equally exact, perhaps more exact than standard commercial testing equipment."

INDUSTRY REPORTS ON FURNACE OPERATION:

PRODUCTION UP, COSTS DOWN WITH CITIES SERVICE HEAT PROVER

THE CITIES SERVICE HEAT PROVER . . . Not an instrument that you buy . . . but a service we supply . . . **FREE!**

Shown above are just two of the many outstanding accounts of the Heat Prover's impressive accomplishments. Wherever a furnace operation is involved, the Heat Prover can help increase productivity by providing:

- **Rapid, continuous sampling**
- **Simultaneous reading of oxygen and combustibles**
- **Direct measurement of oxygen and combustibles**
- **Easy portability**
- **Free maintenance and re-calibration service**

Learn how the Heat Prover, supplied and maintained free by Cities Service, can benefit you. For details, contact your nearest Cities Service office or write: Cities Service Oil Company, Sixty Wall Tower, New York City 5, N. Y.

CITIES SERVICE
QUALITY PETROLEUM PRODUCTS

Rubber Roll For Sheet

A SERIES of small rubber rolls that rotate on a common, stationary shaft comprises a new type of roll for sheet pickling operations.

On an installation at Pittsburgh Steel Co.'s Allenport, Pa., plant, 21 of the midget rolls form a rotating rubber cushion to support sheet steel as it passes from one pickling tank into another. Under pull of the steel sheet, the ring-like segments rotate individually to produce the effect of a turning, but bearingless, roll.

Three Functions—A B. F. Goodrich development, the sectional roll serves three functions: Prevents sheet steel scratching, reduces maintenance cost, simplifies roll warehousing.

Each rubber section is 4 in. wide, weighs 9 lb and has a 1-in. soft rubber cover mounted on a 1-in. base of hard, graphite-impregnated, internally-lubricated rubber. Graphite base provides an inner surface that allows the ring to turn easily around the 6¼-in. diameter rubber-covered shaft.

Multiple Strand—The new roll also is recommended for multiple-strand pickling or for submerged use in any pickling operation. Its construction is suited to handle several strands of steel traveling at different speeds across the roll.

Maintenance costs are reduced by eliminaton of bearings and the subsequent lubrication problem. Installation simplicity results from placing in rubber-covered steel boxes cemented into the brick tank walls. The shaft can be removed easily for replacement of one or more rubber rings.

How Much

Excess Weight

in Your Product?

Trim it down to "fighting weight" with stampings by GEOMETRIC

The cost of your product is largely determined on the drawing board. Whenever you use castings or forgings as component parts, where stampings would do as well, you increase the weight and cost of your product unnecessarily.

Many progressive manufacturers have cut the cost of component parts up to 75% by converting from castings to stampings. Savings of 50% are common.

Geometric Engineers, trained in the analysis of all kinds of stamping problems, are glad to show you how your product, or parts of it, can be made better, lighter and at much lower cost in our modern high-production stamping plant.

Write today for free booklet — "Geometric Craftsmanship"

GEOMETRIC STAMPING CO.

A Subsidiary of Barium Steel Corp.

1130 E. 200th Street Cleveland 17, Ohio

They Use Tailor-Mades . .

Cans slide onto table down a gravity chute (below), index under press ram, get sprayed with lubricant, are redrawn and are eased off the table by a stationary rail (above)

AUTOMATION BY the equipment manufacturer was the prescription that cured an ailing blanking and drawing line at Vulcan Tin Can Co., Bellwood, Ill.

Rejection rate was high. Can blanking and redrawing were being performed on a hand-fed space-consuming mechanical press which demanded elaborate worker safety precautions.

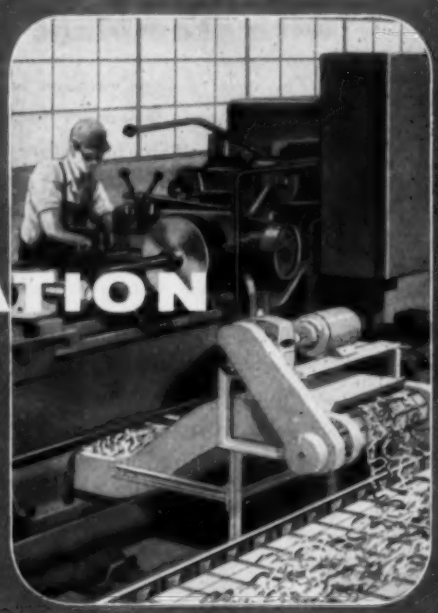
So the company turned to a 6-ton hydraulic Multipress with an index table manufactured by Denison Engineering Co., Columbus, O. The index action is interlocked through the hydraulic system of the press for positive sequence of movement, with the table dial regulated for about 35 indexes a minute.

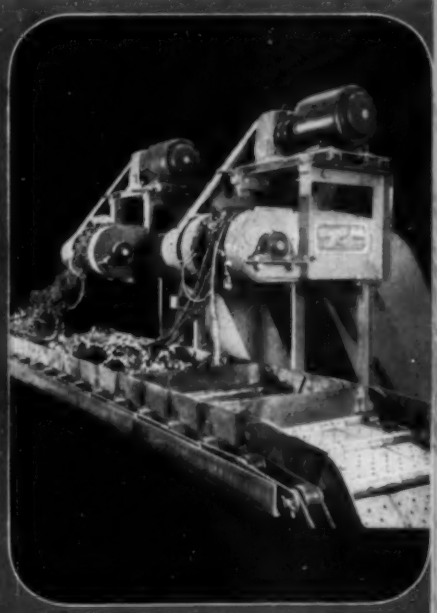
Automatic hoppers feed workpieces to the table. Pieces index under the press ram, are redrawn and then are brushed off down a chute by a stationary rail against which the next index carries them. As one workpiece slips off the table, another slides into place on the press.

Stroke length, ram speed and pressure are preset and uniformly maintained for each cycle. Workpieces are protected during drawing by a sprayed lubricant.

The new setup is drawing 2000 cans an hour at cost savings so great that the installation paid for itself in a few months.

May-Fran
. . . first
for
AUTOMATION
in
scrap
handling
systems

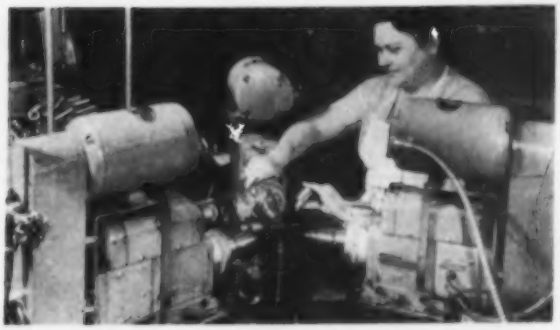




The CHIP-TOTE conveyor permits complete utilization of machine tools by eliminating shut-down for manual scrap removal.

It handles a continuous flow of hot, wet or dry chips, turnings and borings from any multiple spindle automatic machine.

. . . They Roll Their Own



Versatile setup of air-hydraulic drill units around an indexing fixture has brought 33 per cent increased production in drilling multiple holes in screw machine products

HOME GROWN AUTOMATION answered the needs of a company caught in a bottleneck.

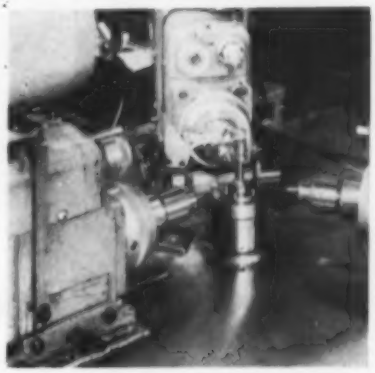
Stepped-up production at J. J. Tourek Mfg. Co., Chicago screw machine products firm, called for an automatic high-speed drilling machine. Needed was a tool that would drill multiple holes in varying positions in many different metals. Typical job: Drilling holes in the hex head of a jet engine bolt. The firm decided to build its own machine.

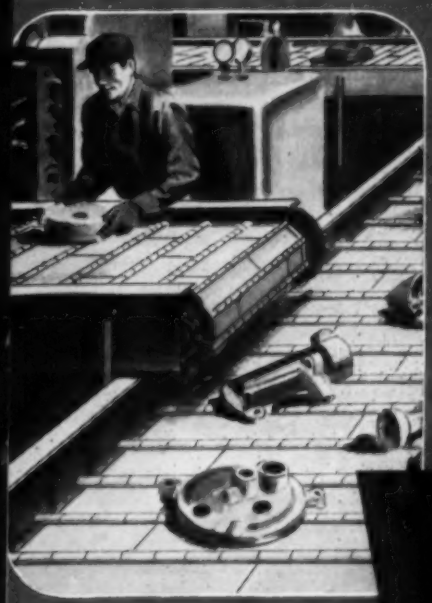
Core of the machine is an indexing fixture and quick acting clamp for holding the part to be drilled. Around it on a horizontal table are mounted three Rockwell air-hydraulic drill units, which may be positioned in five different keyways around the table.

The drill units are electrically controlled for fully automatic operation either simultaneously or separately. Hydraulic system of the drill units gives even feed pressure, vitally necessary when drilling stainless.

Adapters on the indexing head accommodate a variety of parts. Chips are washed away by lubricant ejected under pressure through the indexing head.

The operator loads and unloads the parts manually. She flips the clamp down to hold the part in place and depresses a foot switch to start the drilling operation.





Now is the time to put AUTOMATION to work . . . Now is the time to cut production costs . . . May-Fran engineers design and build complete scrap handling systems for the automatic removal of machine turnings or chips. May-Fran conveyors will transmit scrap to ultimate point of disposal.

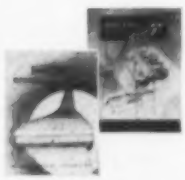
Press Scrap systems can be made completely automatic. Hinged-steel belt will take scrap from presses, handle it through blanking, shearing, forming and baling processes, and deliver it to rail cars.

May-Fran is prepared to engineer, fabricate and install complete conveyor systems to your specifications.

Write today for complete information on how an automatic scrap removal system will cut your production costs.

Bulletin MF-530 describes the new Hinged-Steel conveyor belt.

Bulletin MF-640 describes the Chip-Tote conveyor which removes scrap from operating machines.



DESIGNERS AND ENGINEERS OF COMPLETE SCRAP HANDLING SYSTEMS

MAY-FRAN ENGINEERING, INC.

Hinged-steel belting handles scrap as well as hot heavy and abrasive castings. Belt is economical . . . maintenance-free.

5003-MF

1725 CLARKSTONE ROAD
CLEVELAND 14, OHIO

Gage design differs from tool design in a great many respects.

Too Much Expected of Tool Designers?

Why do some firms insist on putting their tool designers on the spot? Why do they expect these highly-skilled specialists to engineer satisfactory *gages* for special requirements?

There are two reasons. Tool designers have performed wonders in their own field. So their managements understandably have great faith in them. Tool designers, by their very nature, love to solve problems. So, they accept the challenge involved in special gage designing.

It doesn't pay . . . because the experience of the average tool designer does not give him the answers to these questions: Is a *special* gage necessary? *Which* is the best gaging system for the job . . . air, dial indicating, electric, electronic? *How much* will a specially engineered gage cost . . . if required?

Designing machines, fixtures and tools involves holding workpieces in position by force — transferring and transforming power to act as wanted—counteracting heavy stresses and strains.

Designing precision gages, however, requires knowledge of how to magnify and transfer measurement variations precisely, without loss of motion — with a minimum of friction and inertia in the working parts — and a hundred other details which do not concern the usual tool and machine designer.

To get the right answers . . . call in your nearby Federal sales engineer. He is backed by thousands of Federal gage designs and can give unbiased advice about air, dial indicating, electric or electronic gages . . . because Federal makes them all.

Our new booklet "A Management Blind Spot" reveals unappreciated shop situations and tells how they can be corrected. For your copy, write

Federal Products Corporation,
2110 Eddy St., Providence 1, R. I.

Ask **FEDERAL**

FOR ANYTHING IN MODERN GAGES...

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automatically Controlling Dimensions on Machines.

Extruding Aluminum

THE BIG PRESSES are paying off for aircraft fabricators. Here's a view of what Alcoa calls the widest aluminum shape ever extruded flat. Produced on the big extrusion press at the company's Lafayette, Ind., plant (STEEL, May 31, p. 96), it will appear as a tail section on a Navy jet.

Even Larger—The press can apply 14,000 tons to force aluminum through its dies. It extruded this 23-in.-wide section in 75S alloy. It can turn out even larger sections —up to a 34-in. width.

These are extruded in a vee configuration and flattened prior to shipment. The vee-shaped extrusions permit thinner as well as wider sections to be supplied.

Painting School

Classes for the Fall session of Binks Mfg. Co's School of Spray Painting will be held November 8 to 12. The course will be conducted by William Beacham, director, research department.

Use of the latest audio-visual aids in instruction will the used. Class members learn by doing. They will operate the equipment, disassemble it, put it back together and then conduct tests to see that it is in proper adjustment.

Curriculum—Paint circulating systems, fluid handling pumps, oil and water extractors, flocking equipment, compressors and all auxiliary equipment will be covered.

Applications should be sent to E. F. Watts, Binks Mfg. Co., 3122 Carroll Ave., Chicago 12. There is no charge for the course. Classes are limited to 25.

METAL WORKING

Calls for H-P-Ms

Drawing, forming, coining, embossing, flanging, sizing, trimming, die straightening . . . H-P-M all-hydraulic FASTRAVERSE presses are the sure way to increase production profits on all metal working operations. Here is actually 4 presses in 1 . . . single action, single action with cushion, double action, double action with cushion . . . for universal application. Talk to an H-P-M engineer today.

HPM

THE HYDRAULIC PRESS MFG. COMPANY

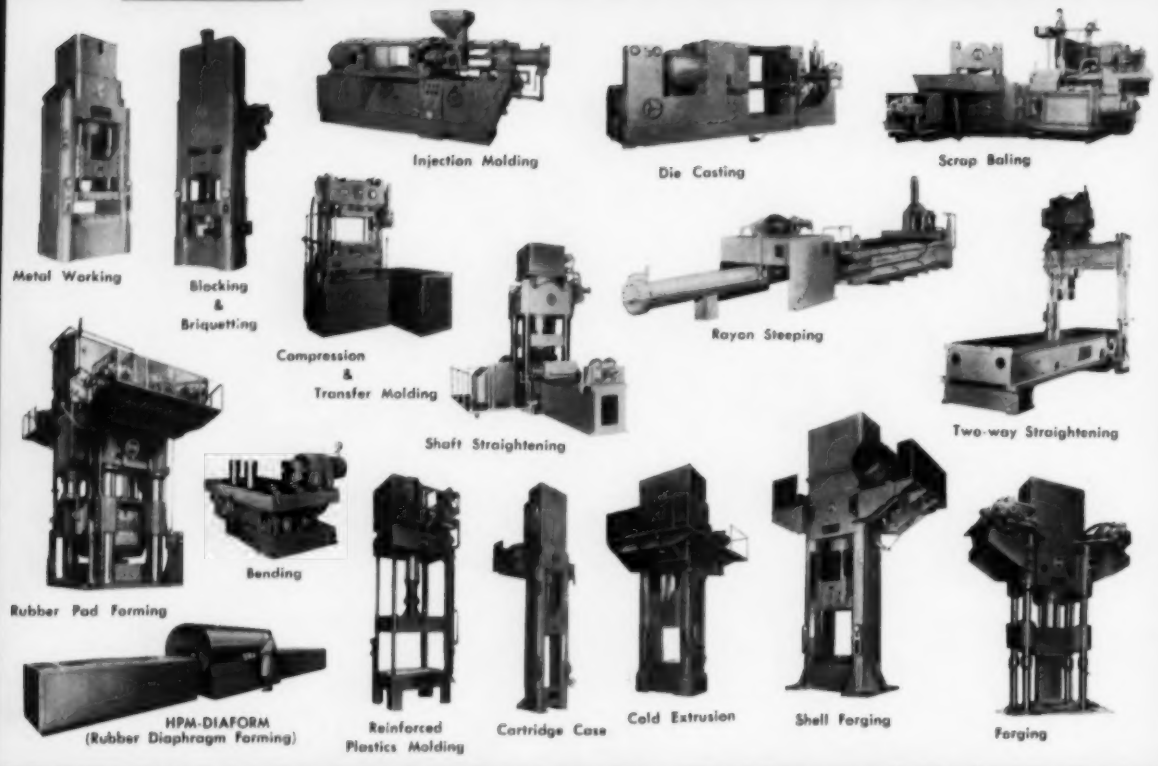
MOUNT GILEAD, OHIO, U.S.A.

A FEW OF THE HUNDREDS OF USERS OF H-P-M ALL-HYDRAULIC FASTRAVERSE PRESSES

Admiral • Allis-Chalmers • American Locomotive
Boeing • Briggs • Budd Wheel • Buick • Douglas
Caterpillar Tractor • Chevrolet • Chrysler • Goodrich
Consolidated Vultee • Curtiss-Wright • Frigidaire
Ford • General Electric • Westinghouse • Goodyear
General Motors • Hot Point • Hughes Tool • Modine
International Harvester • J. I. Case • Western Electric
John Deere • Lockheed • Massey-Harris • Mullins
North American • Oldsmobile • Oliver • U. S. Steel
Pratt & Whitney • Revere Copper & Brass • Servel
Ryan • Thompson Products • U. S. Rubber • Timken

SEE H-P-M's COMPLETE LINE

ALL-HYDRAULIC *FASTRAVERSE* PRESSES FOR EVERY PRESSURE PROCESSING NEED!



A *NEW* COMPLETE LINE OF HYDRAULIC COMPONENTS!

CYLINDERS
150 P.S.I. Air and 300 to 3000 P.S.I. Oil Hydraulic

VALVES
Directional and Functional, complete range to 3000 P.S.I.

PUMPS & MOTORS
Fixed and Variable Displacement to 3000 P.S.I.

POWER UNITS
Complete power packages for every application.

ACCESSORIES
Items to complete that hydraulic circuit.

WORLD-WIDE SALES ENGINEERING COVERAGE

H-P-M DOMESTIC OFFICES
CHICAGO 45, ILLINOIS
DETROIT 2, MICHIGAN
MOUNT GILEAD, OHIO
TEANECK, N. J.
PITTSBURGH 22, PA.

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BIRMINGHAM 3, ALABAMA
Quinn, McKerall & Quinn
CAMBRIDGE 42, MASS.
Austin Hastings Co., Inc.
DALLAS, TEXAS
Tri-State Machinery Co.
DENVER, COLORADO
The Mine & Smelter Supply Co.
HOUSTON 2, TEXAS
The H. L. Thompson Co.
KANSAS CITY, MISSOURI
Blackman & Nuetzel Mach. Co.
LOS ANGELES 11, CALIF.
Machinery Sales Co.
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Fuchs Machinery & Supply Co.
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Hallidie Machinery Co., Inc.
RICHMOND 2, VIRGINIA
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Blackman & Nuetzel Mach. Co.
SALT LAKE CITY, UTAH
The Mine & Smelter Supply Co.
SAN FRANCISCO 3, CALIF.
B-H-S Machinery Sales Co.
SEATTLE 4, WASHINGTON
Hallidie Machinery Co., Inc.
SHREVEPORT, LOUISIANA
Frederic & Baker
TULSA, OKLAHOMA
Blackman & Nuetzel Mach. Co.
WASHINGTON, D. C.
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CANADIAN REPRESENTATIVE
TORONTO, ONTARIO
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EXPORT DEPARTMENT
MOUNT GILEAD, OHIO
The Hydraulic Press Mfg. Co.
CABLE ADDRESS: "HYDRAULIC"

THE HYDRAULIC PRESS MFG. CO. / MOUNT GILEAD, OHIO, U. S. A.

New Tooling Plate

NOW YOU can get an aluminum tool and jig plate for hydropress and stretcher form blocks, jig assemblies and other tooling.

Rolled and stretched from 61S-T66 plate (6061-T66 under new alloy designations effective October 1), the product has been introduced by Kaiser Aluminum & Chemical Corp.

Prominent Property — Dimensional stability is high. Special fabricating practices and thermal treatments are used in obtaining the T66 temper. Stretching relieves internal stresses. The plate carries a flatness specification of ⅛ in. in 6 ft or any lesser dimension.

A hydropress form block made from the alloy was tested at Convair Division, General Dynamics Corp. Used to form several parts from 24S aluminum, it revealed no warpage after measurement. It was also used for forming a magnesium part and on cooling, returned to its original dimensions.

For many applications, the smoothness of the tooling plate will make it unnecessary to machine the surface. If machining is necessary, stress-relief resulting prevents possibility of distortion.

Mechanical Properties — Tensile strength is 42,000 psi; yield strength is 37,000 psi and elongation is 10 per cent.

The plate is available up to a maximum of 100 in. wide, 396 in. long and 2¼ in. thick. Its introduction in this size range is made possible by Kaiser's 5-million-lb plate stretcher.

ALUMINUM PART
. . . formed on block

The inside story on industrial truck battery costs

You are looking at the interior of one of America's most unusual batteries! It is unusual because the cells themselves are made of steel . . . not just the "steel tray" assemblies. Result: the strongest battery construction available for industrial truck use today.

Furthermore, the electrolyte used in EDISON batteries is alkaline—a natural preservative of steel. In daily use, these battery features mean that EDISONS are electrically foolproof—not harmed by accidents as over-charging, short circuiting, etc. That's why, in hundreds of truck operations, EDISONS give *more than twice* the performance life of conventional batteries.

Such profitable EDISON features add up to one important conclusion: most dependable power at lowest over-all cost.

Personally evaluate these facts. Request a visit from the EDISON Field Engineer in your area. Write Edison Storage Battery Division, Thomas A. Edison, Incorporated, West Orange, New Jersey.

Most dependable power... lowest over-all cost you get both with an EDISON

EDISON
Nickel • Iron • Alkaline
STORAGE BATTERIES

EDISON ALSO MAKES THE FAMOUS "V.P." VOICEWRITER AND THE TELEVOICE SYSTEM

NEW 3-STAND High Speed Tandem Flat Wire Rolling Mill at Ansonia, Conn., operates at speeds up to 2000 feet per minute.

New equipment, new methods increase range and quality of Anaconda Wire

Now you have a wider selection of Anaconda Wire to choose from than ever before.

Anaconda Wire is fabricated to satisfy a very wide range of requirements, both manufacturing and functional. A wire usually can be adapted to precise tooling and production rate requirements and also possess the necessary properties for its end use function.

Anaconda Wire is produced for thousands of different applications. Copper and more than 100 different copper alloys are processed into wire in an almost unlimited variety of sizes and shapes, tempers and finishes.

In addition to Yellow Brass, Red Brass and Commercial Bronze, we produce Everdur*, Phosphor Bronze, Nickel Silver and Cupro Nickel. We also make Leaded Yellow Brass and Leaded Red Brass for special applications where heading and machining properties are desired.

New equipment enables us to produce a wide range of inside diameters of coils (wound either clockwise or counterclockwise) in coil weights up to 400 lb. – spools and reels of wire from 2-lb. up to 1000-lb. capacity – stranded material in various weights up to 2000 lb.

Quality? It's at an all-time high. Casting procedures have advanced. And new rolling and drawing equipment enables us to produce wire of superior grain structure. Every foot of Anaconda Wire is sound and uniform. Working characteristics are excellent.

Our Technical Department will cooperate in helping you find the combination to that "one best wire." The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

*Reg. U. S. Pat. Off. 6481

ANACONDA®

Copper and Copper Alloy Wire

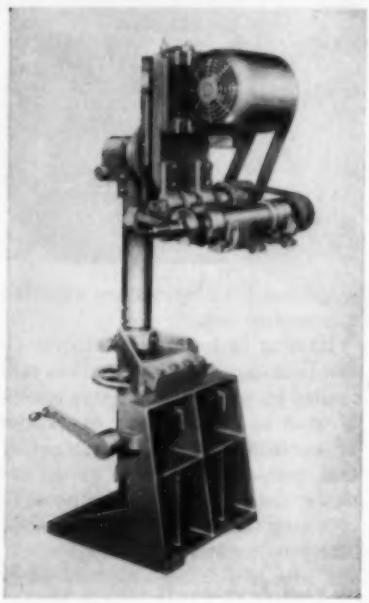
NEW PRODUCTS and equipment

Reply card on page 165 will bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue

Finishing Machine

. . . polishes, buffs

Model 50-99 buffing polishing head and stand unit is powered by a 3, 5 or 7½ hp, 1750 rpm motor or a 10-hp 3500-rpm motor. Net weight of over 1400 lb assures



vibrationless operation, resulting in uniformity of finish on parts.

An ammeter is standard equipment. Periodic reading takes the guess out of work. Hammond Machinery Builders Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 1

Power Transistor

. . . one-watt rating

A combination of mounting and physical design has made possible the rating of this germanium power transistor now in pilot production at their Electronic Tube Division.

The black, ribbed surface provides cooling capacity for the collector dissipation rating. Additional cooling is accomplished by fastening the unit in thermal contact with the chassis as shown. 2N71 will be applicable to any low-

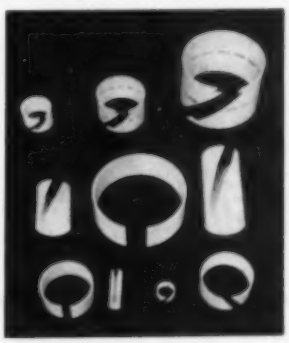
frequency circuit, such as class A amplifiers, where output power is desired. Westinghouse Electric Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 2

Bearing Liners

. . . available separately

This company previously marketed the complete bearing—a metal outer shell containing a liner. Now liners alone are offered. This will enable the elimination of



the outer shell in applications where the user can retain the liner in a housing of his own.

They come in two types: Liners used in the standard-line bearings are offered for applications where lubrication is required; and simplified liners with a straight or a spiral compensation gap, and without the interlock or oil distribution grooves. Thomson Industries Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 3

Vertical Milling Machine

. . . with six improvements

Among the design improvements made by U. S. Burke Machine Tool Division are: Relocation of the vertical feed handle for greater

convenience; addition of a micrometer dial giving accurate indication of table setting or movement on both ends of the table. They have a hard chrome plate quill carried in the precision bored and honed head for exceptional accuracy. A draw bar speeds tool changes and protects the tools.

Tightening or loosening a single nut sets or releases tools from the spindle taper without danger of dropping the tools. A permanently secured plate above the knee gears has been added to the chip

"doodles" or complete plans?

Whichever you have

Standard's complete conveyor service can save you money!

Many a complex conveying problem has been solved by Standard engineers with only a customer's "doodle" drawing to follow. And often when complete plans are submitted, Standard engineers make recommendations that improve the conveyor application . . . save time and money as well.

If you prefer to do your own conveyor planning, we suggest you send for Bulletin 63-D. Here in 28 fast-reading pages you get all the specifications, drawing and application data on a wide range of Standard Conveyors. This includes gravity and power conveyors and accessory equipment: Handidrive pre-built conveyor units and the complete, self-contained portable conveyor units listed below.

Call your Standard Conveyor representative listed in your classified phone book — or send for copy of Standard General Catalog — address Dept. ST-104

STANDARD CONVEYOR COMPANY
General Offices: North St. Paul 9, Minnesota
Sales and Service in Principal Cities

Nearly 50 years of conveyor experience

Standard

GRAVITY & POWER Conveyors
ROLLER • SLAT • WHEEL
SECTIONAL • BELT • CHAIN • PUSH-BAR
PORTABLE CONVEYOR UNITS:
HANDIBELT • INCLINEBELT • EXTENDOVEYOR • UTILITY BELT-VEYOR
HANDIPILER • LEVEL BELT • LITEWATE • HANDIDRIVE
PNEUMATIC TUBE SYSTEMS

NEW PRODUCTS and equipment

guard. New optional accessories are available. Improvements have not changed the basic design. U. S. Burke Machine Tool Division.

FOR MORE DATA CIRCLE REPLY CARD NO. 4

Walkie-Type Truck

. . . speeds stock selection

The operator of the PO-40 Hi-Lift electric truck doesn't have to leave the platform, where travel,

steer and lift controls are mounted in a control box.

Raising or lowering platform (it can be stopped at any level) is controlled by push buttons. One handle is used to control four operations of horizontal travel. Remote control enables operator to go up and down aisles and steer easily while selecting stock from either side. Barrett-Cravens Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 5

Welding Rod

. . . of extruded white metal

Oxweld No. 49 Rod, an extruded white metal rod, was developed for low-temperature oxy-acetylene welding of die castings. It flows smoothly and fuses readily without flux or excessive puddling. Welds made with it in zinc-base alloys are clean and uniform and have greater strength than the original cast metal. Satisfactory welds can also be made in most aluminum and magnesium-base die-cast alloys.

Included with each package are easy to follow instructions for

There's room for greater profits

...with the NEW Torrington W3001

TORSION SPRING WINDER

Room — room in which to work — is the outstanding feature of Torrington's new torsion spring winder. This modern, high production machine actually provides the largest tooling area ever devised. In addition, the W3001 offers many other advantages which will help spring-makers boost their production of torsion springs and reduce their costs at the same time.

• Tooling area measures 12" by 18" • Tooling is faster and easier • Tools themselves can be made sturdier and more durable • Shafts on 3 sides plus vertical 2-slide attachment give great versatility in producing complex forms • Capacity extends to 10 turns of .080" wire, thus meeting the great majority of customer requirements for torsion springs • Rugged design means years of trouble-free operation with minimum downtime for maintenance and repairs.

The Torrington Manufacturing Company has built more spring coiling machinery since 1937 than all other manufacturers combined. The knowledge and skill gained while serving spring makers during this period has now been used to create a torsion winder which we firmly believe is the finest ever offered to the industry. If you manufacture torsion springs, this new machine will give you faster, more efficient production and unprecedented versatility to meet your customers' most exacting needs.

Call or write, *now*, for full information.

See the Torrington exhibit at the National Metals Exposition, November 1 to 5. Booth 2060, International Amphitheatre, Chicago.

THE
TORRINGTON
MANUFACTURING COMPANY
TORRINGTON · CONNECTICUT
WIRE FORMING MACHINERY DIVISION

C·F LIFTERS

SAVE TIME...
LABOR...
MATERIAL...

C-F Lifters give you the fastest, cheapest and safest way to handle loose or bundled sheet steel or plate. 1 man operation saves labor; infinite adjustments of Lifter jaws permit it to handle many widths of steel . . . wide carrying angles hold packs securely, won't damage even highest grade sheets. C-F Lifters are made in standard and semi-special models with capacities from 2 to 60 tons.

Write for Bulletin SL-28. It describes and illustrates C-F Lifters money and time saving advantages.

CULLEN-FRIESTEDT CO.
1308 SOUTH KILBOURN AVENUE • CHICAGO 23, ILLINOIS

PUNCHES
DIES · RIVET SETS
COMPRESSION
RIVETER DIES

Made of highest standards and uniform quality thus insuring maximum service.
Since 1903

Large inventory of stock sizes of round punches and dies also rivet sets available for immediate shipment. Square, rectangular, oblong and elliptical shapes made to order.

Write Dept. A for New Catalog 54

GEO. F. MARCHANT COMPANY
1420-34 So. ROCKWELL STREET · CHICAGO 8, ILLINOIS

NEW PRODUCTS and equipment

welding die-castings such as those used in paint sprayers, fuel pumps, vacuum cleaners, coal stokers, carburetors, motor and gear housings, portable tools, etc. Union Carbide & Carbon Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 6

Tool Control Unit

. . . for metalworking equipment

The unit is available in four different sizes with one, two, four or eight Toolometers that automatically shut down the machine when

tools need changing.

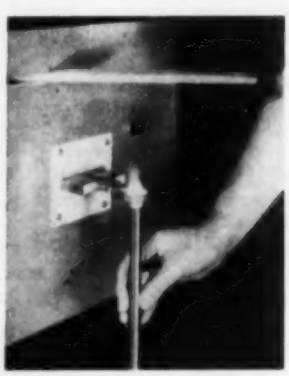
Operation is simple. The pointer on the Toolometer is set at a point representing expected output of pieces per tool sharpening. It indexes counter-clockwise with each machine cycle. When it reaches zero, the machine automatically shuts down. Each has a red area that represents the danger zone. Cross Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 7

Induction Heater

. . . heats in seconds

Induction heat now can be used for butt welding titanium rods or to maintain desired temperatures



until machining operations are completed. Soldering, welding and annealing of other, more common-

THIS BLAST FURNACE, rated at 480,000 tons annual capacity, is one of seven furnaces (five are shown in this photo) and an open-hearth shop designed and constructed by Arthur G. McKee & Company in this immediate area.

FAST CONSTRUCTION BY McKEE GAVE THIS BLAST FURNACE A *35,000-ton head start!*

AT a time when pig-iron demand greatly exceeded supply, this furnace was completed by McKee 27 days ahead of schedule.

In addition to the money and man-hours saved by efficient work and time-saving methods, every day saved in engineering and construction of this plant meant an added day of profit-producing operation at the rate of 1300 tons per day.

This kind of engineering service transforms your new plant ***cost*** into an earning ***investment*** at the earliest possible date—means dollars in your profit column and dividends to your shareholders.

McKee services are geared to move fast through design, engineering, purchasing and construction stages to produce results like this—results that can be yours when you call in McKee.

McKee Engineering Services

Arthur G. McKee & Company • Engineers and Contractors

Headquarters: McKee Building • 2300 Chester Avenue • Cleveland 1, Ohio
Offices: New York • Tulsa, Oklahoma • Union, N. J. • Washington, D. C.
British Representatives of Metals Division: Head, Wrightson & Co., Limited
Canada: Arthur G. McKee & Company of Canada, Ltd., 350 Bay St., Toronto

ly used metals are accomplished by the Model 10,000 heater in a fraction of a second.

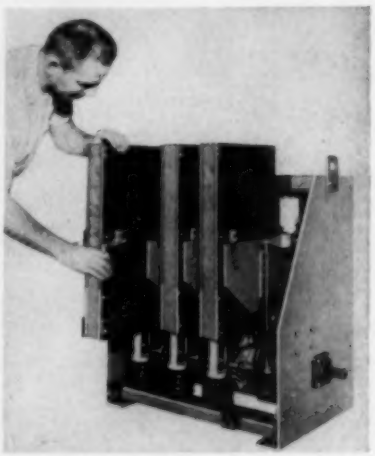
The unit consists of induction coil, 10,000-watt, air-cooled tube, mica silicone transformers and heavy-duty, all-aluminum tank capacitor filled with dielectric synthetic Hectranol. The manufacturer will do sample work on request and offer recommendations. Radio Frequency Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 8

High Voltage Starter

. . . built in three styles

These Air-Break Starters for 2200 to 5000 volt squirrel-cage, wound-rotor and synchronous motors incorporated safety door-switch on the disconnect switch compartment, swinging overload panel, self contained bus for group installation. Meters as required and cabinet-doors may be lifted off concealed-type hinges during installation. Contactor is accessible from the front and rear of the cabinet. For reversing service, forward and reverse contactors are mechanically as well as electrically locked.



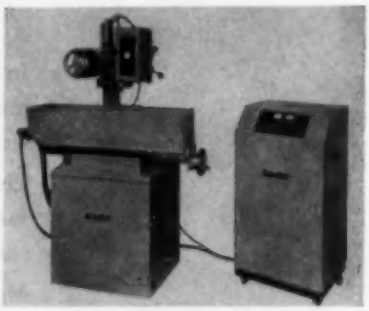
They are built for 50,000 kva interrupting capacity, with power fuses for systems of 150,000 kva and 250,000 kva and in the Valimitor style. Electric Controller & Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 9

Machine Tool

. . . dual coolant supply

This electrical discharge machine has a 9 x 15 in. movable bolster plate. The specific design of the work pan mounting provides use of the entire 10 x 42 in. table area. M-500 is of heavy cast frame construction with micrometer adjustment on longitudinal feed, head cross feed and head vertical feed.

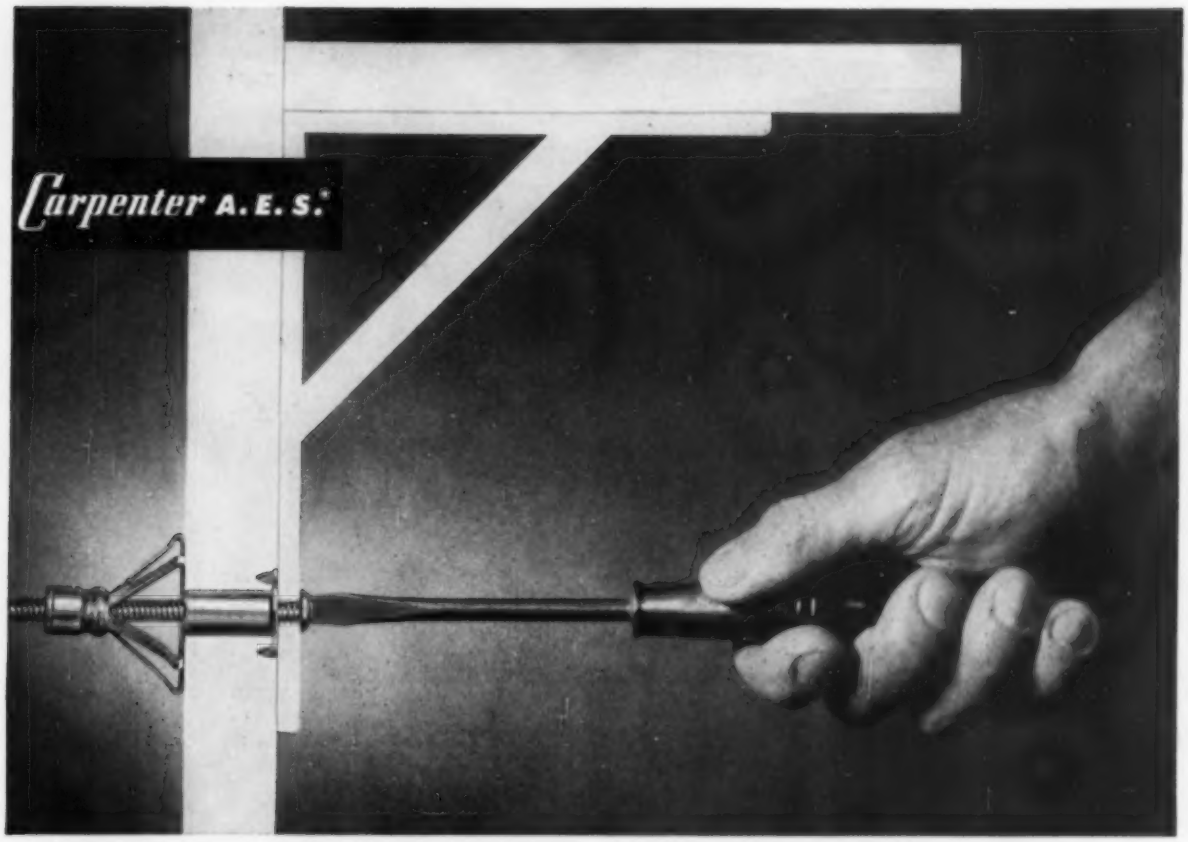


The 9½ in. travel is provided in the lapped-in quill. The tool is mounted on a heavy base constructed of No. 8 gage steel plate to prevent warping of the mounting table. Automatic feed is disconnected by a simple push-pull operation, allowing for quick hand

FOR HIGH PRODUCTION
THREAD ROLLING MACHINES

comes to HARTFORD Special

THE HARTFORD SPECIAL MACHINERY CO. · HARTFORD 12 CONN.



Help for Handymen at Home

Another example of how Carpenter *Application Engineering Service is helping industry cut costs.

Ever try to turn a screw through plaster into a hollow wall? The result is usually disastrous . . . unless a device, such as this patented screw anchor, is used. With this anchor it's an easy matter to drill a hole, insert the device, then turn it tight. And it holds securely. But you'd be surprised at the production problems involved, even with a small item like this. For example, it's a highly competitive product turned out in huge quantities. This means that the tools and dies used to make it have to be just right—they have to hold sharpness, be accurate, provide adequate toughness, and hold up in the presses with no trouble while producing millions of parts.

To help control production costs, the manufacturer called on Carpenter Application Engineering Service for counsel in selecting die steels for the different sections of the progressive dies. A.E.S. supplied the answer—recommended five different steels in the Carpenter Matched Set . . . each engineered to perform its job best. Here, in the manufacturer's words, is the result: "With the help of Carpenter die steels we've been able to control our production costs so closely that there has been no price increase in the last five years!" (A detailed Field Report on the tooling for this job is available on request.)

Time and again, industry is finding new ways to hold costs in line and improve product sales with the help of Carpenter Application Engineering Service. A.E.S. is a service backed by almost 70 years of leadership in specialty steel development. It embraces trained Field Engineers, experienced representatives, competent Mill Metallurgists ready to work with you for best results. A.E.S. starts with your first call to Carpenter. THE CARPENTER STEEL COMPANY, 139 W. Bern St., Reading, Pa.

Carpenter STEEL — **Tool, Alloy and Stainless Steels**

Pioneering in Improved Tool, Alloy and Stainless Steels Through Continuing Research

designed for easy re-design!

Weldments offer many advantages . . . especially the opportunity for product re-design at a later date. A weldment design is never frozen! It is readily adaptable to technological improvements and to changes dictated by competitive conditions. Years after a welded structure is completed and in use, improvements can be made simply and inexpensively . . . often on the job, and involving a minimum of down time.

Graver provides complete design, research and manufacturing facilities for weldments of all sizes and shapes . . . from the smallest weldment up to and including 50 tons. We solicit your inquiries. WRITE GRAVER'S WELDMENT DIVISION FOR A COMPLIMENTARY COPY OF BROCHURE: "WELDMENTS."

GRAVER TANK & MFG. CO., INC.

East Chicago, Indiana

NEW YORK • CHICAGO • PHILADELPHIA • ATLANTA • FONTANA, CALIF.
DETROIT • CLEVELAND • PITTSBURGH • HOUSTON • CATASAUQUA, PA.
SAND SPRINGS, OKLA. • CASPER, WYO. • ODESSA, TEXAS • LOS ANGELES
EDGE MOOR, DEL. • TULSA • SAN FRANCISCO

GRAVER ... *source for quality weldments*

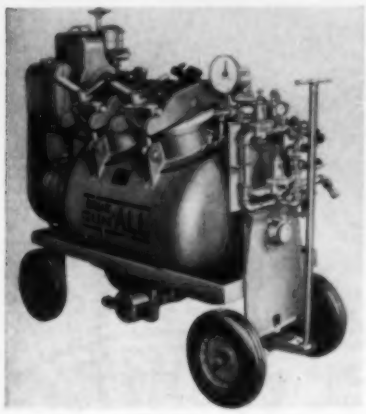
wheel adjustment of the electrode relative to the work. Elox Corp. of Michigan.

FOR MORE DATA CIRCLE REPLY CARD NO. 10

Pressure Gunning

. . . controls wet mix

Materials are thoroughly blended in the dual tanks, mixed with an exactly measured amount of water for proper consistency to apply refractories satisfactorily.



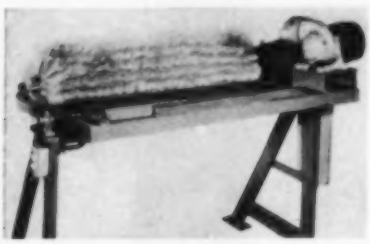
The complete mix assures perfect adhesion and is further homogenized by controlled air-action in the gun. Even texture is obtained without dry spots and less rebound loss. True Gun-All Equipment Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 11

Hood Washing Machine

. . . operates attendantless

This machine is for the removal of sludge from complex shaped



metal parts after wet sanding in mass production metal forming shops. The frame remains stationary, straddling the conveyor belt that carries metal sections underneath a rotating cylinder brush.

The cylinder brush is counterweighted, causing it to rise and fall with the contour of the parts. An extra long trim on the brush, rotating at 300 rpm, permits access to difficult places. Fuller Brush Company.

FOR MORE DATA CIRCLE REPLY CARD NO. 12

Cold Cleaner

. . . eliminates fire hazard

The Houghto-Clean 402-403 combination is easy to use and mixes readily with cold water.

Advantages claimed for this water emulsion cleaning combination: Thorough removal of shop soil; protection of freshly cleaned surfaces from rust; elimination of heating system costs. E. F. Houghton & Co.

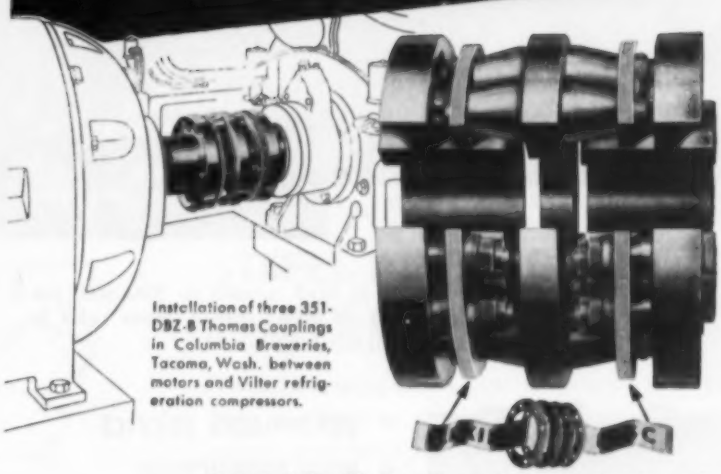
FOR MORE DATA CIRCLE REPLY CARD NO. 13

Coated Mixes

. . . in shell molding, blowing

The Shell Mulbaro was developed by Beardsley & Piper Division. It brings thorough preparation of coated resin sand mixes within the reach of the most modest equip-

THOMAS FLEXIBLE COUPLINGS...
for more years of better service!

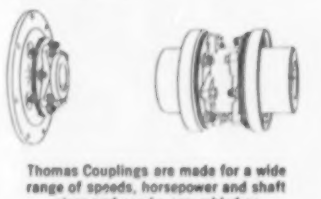


Installation of three 351-DBZ-B Thomas Couplings in Columbia Breweries, Tacoma, Wash. between motors and Vilter refrigeration compressors.

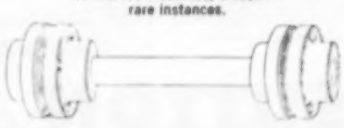
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower and shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.



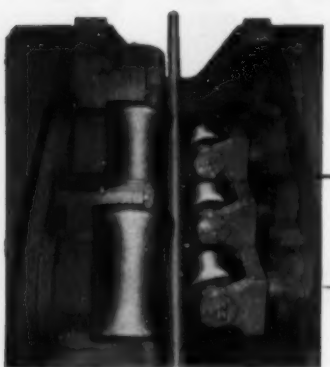
THOMAS

Write for our new Engineering Catalog No. 51A

THOMAS FLEXIBLE COUPLING COMPANY
Largest Exclusive Coupling Manufacturer in the World
WARREN, PENNSYLVANIA, U.S.A.

USE SUTTON 5-Roll STRAIGHTENERS

Steady dependable production at high speeds to 800 feet per minute. Because only one roll of each pair of cross rolls is driven, wear is reduced and roll life lengthened.



- DEPENDABLE SERVICE
- HIGH PRODUCTION
- QUALITY STRAIGHTENING

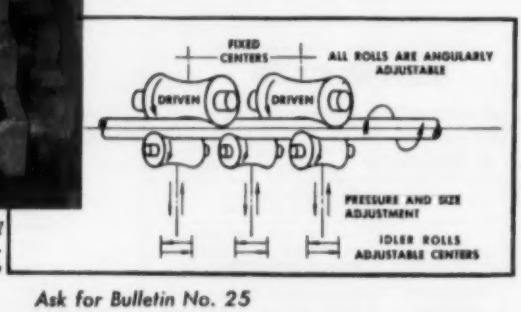


Photo and diagram of 5-roll design shows engineering principle of driven rolls with opposed idler rolls.

Ask for Bulletin No. 25

SUTTON Engineering COMPANY

Manufacturers for Ferrous and Non-Ferrous Metal Industries

STRAIGHTENERS, EXTRUSION PRESSES, HYDRAULIC STRETCHERS, SHEET LEVELLERS, GAG PRESSES, ROTARY CLEANERS, HEAVY-DUTY UNIVERSAL JOINTS, ROLLS.

BELLEFONTE, PENNSYLVANIA

NEW PRODUCTS and equipment

ment budgets. Mixes require up to 50 per cent less resin for comparable strength and may be stored without deterioration. Working conditions are improved.

There is no dust or explosion hazard.

Mixes can be prepared by the wet or dry process. Pettibone Mulliken Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 14

Honing Machine

. . . coolant unit combined

Spindle speeds on this machine are variable from 400 to 1000 rpm

without changing belts. Honing range is from 0.185 to 2.500. No adapters are required. All mandrels fit to the spindle with a bayonet lock. Mandrels or stones

DESK JOBS CAN BE TOUGH

...On wire staples

CONTINENTAL STEEL CORP. KOKOMO, IND. STEEL CONTINENTAL WIRE REG. U.S. PAT. OFF.

SOLVE PRODUCT TRIM OR PARTS PROBLEMS WITH CONTINENTAL'S SHAPED WIRE

Many Continental wire customers save money, add sales appeal to their products by using the right shaped wire for basic parts or exterior trim. Providing wire in special shapes is another Continental service for its customers.

ROUND OR FLAT CONTINENTAL'S PREFORMED STAPLE WIRE IS GEARED FOR PLENTY OF ACTION

Your best guarantee that the staple wire you need has the desired degree of stiffness or meets any other particular wire requirement is to let Continental apply real application engineering to your problem. The fact that Continental wire must be right for your particular product application—for it's made right . . is no idle boast, but a basic Continental policy. This policy has been established over a half century of wire making and applies to wire for preformed staples, as well as wire for thousands of other applications in practically any size, temper, finish, shape or analysis—in low carbon and medium low carbon steels. Take advantage of Continental's wire service. Phone, write or wire us at Kokomo.

CONTINENTAL STEEL

CONTINENTAL STEEL CORPORATION

GENERAL OFFICES • KOKOMO, INDIANA

ODUCERS OF Manufacturer's Wire in many sizes, apes tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquer Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

may be changed without tools and all stones are ground to size.

The Model JCP permits honing over keyways, spline gears and most broken surfaces. A counterbalanced foot pedal is adjustable to any desired pressure. The coolant unit has a newly designed, expandable splash tray. Superior Hone Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 15

Mechanical Driller

. . . has 529 spindles

All movements of the machine are mechanical. The diameter of holes drilled is 3/16 in. The gearless drill head permits centers as close as ¼ in. Material to be drilled is manually loaded, mechanically positioned.

The drill head is directly driven by a 30 hp motor. The ram is actuated by a mechanical motion and is located in the base of the machine. Length of stroke, depth of drill and speed are adjustable to requirements. Zagar Tool Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 16

Welding Electrode

. . . for specified joints

Jetweld 2 HT, containing iron powder in the coating, is especially designed for high speed welding of flat fillet and deep groove joints where high tensile strength and low crack sensitivity are required.

It can be used on either ac or dc current. The bead has excellent wash-in. Slag removal is good. Spatter is reduced to a minimum and smooth appearance on cover pass welds meets automatic welding standards. Lincoln Electric Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 17

Spray Decorator

. . . 1500 pieces per hour

This stationary gun pressure contact machine paints areas up to 3 x 1½ in. A timer controls length of time the gun is spraying, so

the same amount of paint is applied to each piece. A regulator and gage maintains constant air pressure.

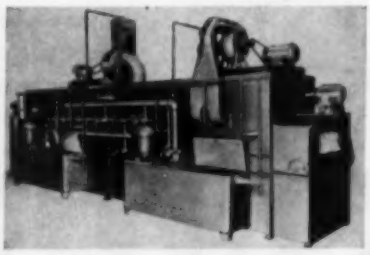
Machine is available with one or two guns in a stationary position. Self-contained and completely enclosed, working parts cannot become contaminated by the exhaust. A built-in air exhaust outlet 8 in. in diameter is sufficient to handle 900 cfm for single gun operation. Conforming Matrix Corp.

FOR MORE DATA CIRCLE REPLY CARD NO. 18

Cleaning Machine

. . . for bearing manufacturers

Bearing parts are carried through a three-phase cleaning



process. Cleaning solvents are of the low-flash petroleum type. An A-F Super-Spray cleaning system is used. Solutions may be emulsion or alkali. Solvent filtration is accomplished by a screen tank with two independent screens. One screen can be removed for cleaning without interrupting the operation.

An automatic fire extinguishing and fire control system is standard equipment on machines using petroleum type solvents. Alvey-Ferguson Co.

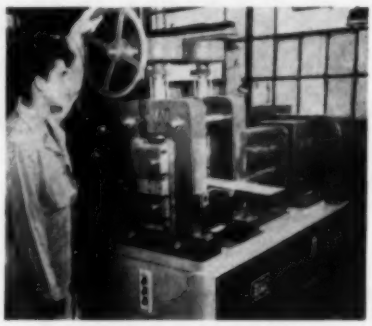
FOR MORE DATA CIRCLE REPLY CARD NO. 19

Rolling Mill

. . . converts from 2 to 4-roll

A combination rolling mill, 2-high/4-high, is capable of reducing an ingot through the sheet stage to foil. Because it can be converted from a two- to a four-high configuration, it is advantageous for firms desiring one machine to do the job of several, to fit space and cost limitations.

The heavy duty mill can be used



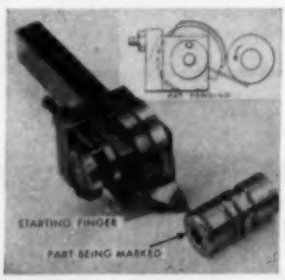
for bar, rod and strip reduction and is designed to fit into a small area. Motor and drive are completely enclosed in the base. Stanat Mfg. Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 20

Starting Finger

. . . for roller die marking

It is intended for use with roller dies to enable oscillation of the



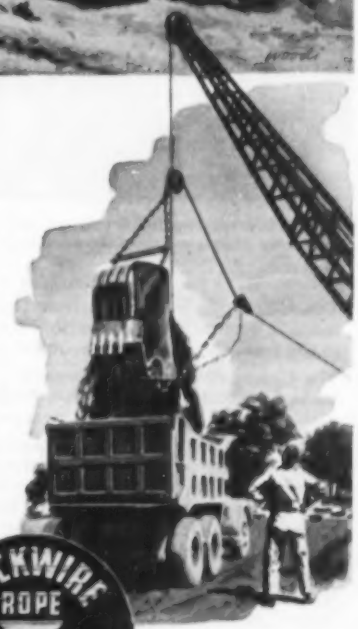
stamp mechanism automatically as the work is being advanced to con-

the dirt flies faster—now with MUSCLES OF STEEL

Straining laborers plying pick and shovel are a bygone memory because of today's excavating and road-building equipment. Modern power shovels and draglines use *muscles of steel*—rugged wire rope—to keep the dirt flying fast.

Helping to clear the way for needed highways is another of the important ways in which Wickwire Rope contributes *muscle* to America's might.

You'll find Wickwire Rope, too, in the mines and the quarries . . . in the oil fields and logging camps . . . with the fishing fleets . . . and in numerous materials handling operations. Whatever the job may be, the extra care and quality fabrication that goes into Wickwire Rope proves itself in longer life, more economical service and utmost reliability.



every industry benefits from wire rope

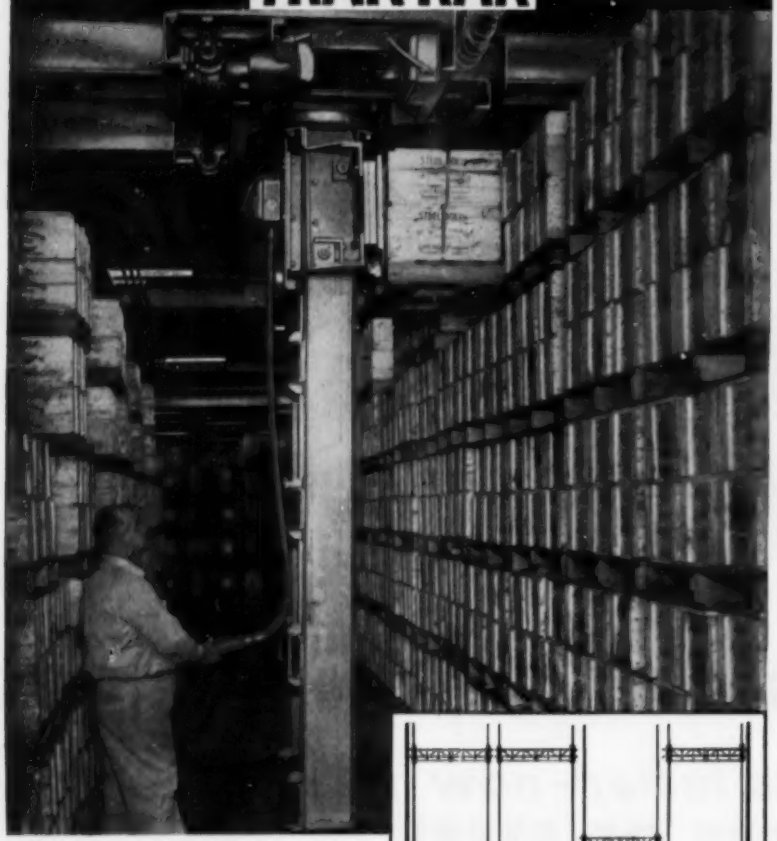
WICKWIRE ROPE

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

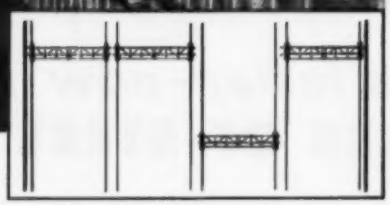
2533

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

85% More Storage Space with CHICAGO TRAMRAIL TRAK-RAK STORAGE SYSTEMS



TRAK-RAK Interlocking Transfer System which permits two hoisting columns to serve four bays.



The Chicago Screw Co. increased pallet storage over 85% in the same storage space in each of four bays with TRAK-RAK Crane System, storing 2100 pallets in the same space formerly required for 1120 pallets.

The Chicago Screw Co. also saved many man hours due to the simplicity and maneuverability of the TRAK-RAK System which allows accurate placing of materials in and out of the storage area.

The original installation served an approximate area of 9,000 sq. ft., with an interlocking transfer system which allows the movement of the hoisting columns from one bay to another. Due to the extreme flexibility of TRAK-RAK Systems, additions can be readily made in most installations. Since the original installation, The Chicago Screw Co. has added a fourth bay which interlocks with the three previous bays.

This system is an under running transfer system; however, TRAK-RAK Systems can also be furnished as top running or self-contained systems operating on rails mounted directly on top of the racks.

ASK FOR COMPLETE INFORMATION... descriptive catalog, pictorial record of various applications and engineering data.

CHICAGO TRAMRAIL CORPORATION
4000 West Washington Boulevard • CHICAGO 24, ILLINOIS

NEW PRODUCTS and equipment

tact with the die. This finger starts the movement of the die as the lathe brings the work toward it. By meeting the die and work simultaneously, scoring, chatter marks or defacing of piece parts are eliminated.

Roller dies furnished by this company are engineered to incorporate the Hoffman starting finger when used on any turning machine. Quality Die Co.

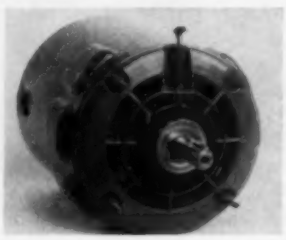
FOR MORE DATA CIRCLE REPLY CARD NO. 21

Shaft-Mounted FHP Motor

. . . for shaft-mounted fans

Totally enclosed and fan cooled, it is designed for dependable, continuous service. Filtered oil keeps the bearing surfaces clean in the all-angle sleeve bearings There is an extended oiler on the shaft end.

The motor is available in one and two-speed single-phase models



and in single-speed polyphase models, with ratings up to ½ hp. Resilient rings on bearing housings and optional resilient base make a wide variety of mounting arrangements possible. General Electric Co.

FOR MORE DATA CIRCLE REPLY CARD NO. 22

Alkaline Rust Remover

. . . nonelectrolytic compound

Alka-Deox 114 is a free-flowing powder used in concentrations of from 1 to 3 lb/gal of water. When a solution of salts is heated from 180° F to the boiling point, rapid removal of rust is accomplished.

There is no attack on base steel due to its alkaline nature. Paints, organic coatings and other surface contaminants are removed together with rust. Because it need not employ electric current, the product is considered ideal for bulk derusting of steel and cast and malleable iron. Enthone Inc.

FOR MORE DATA CIRCLE REPLY CARD NO. 23

FREE LITERATURE

Catalogs and Clip Sheets

Use these reply cards to bring you free literature, editorial clips or more information on new products and equipment described or advertised in this issue.

Transmission Belt

Raybestos-Manhattan Inc. lists design characteristics of the single, endless belt with molded lengthwise ribs—Brochure No. 6638.

FOR A FREE COPY CIRCLE REPLY CARD NO. 24

Precision Tooling

Ehrhardt Tool & Machine Co.'s "Facilities for Precision Tooling" lists all tool room and inspection machinery and equipment on hand —4 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 25

Oxygen Measurement

Minneapolis-Honeywell Regulator Co. describes the application and operation of the A. O. Beckman, Model F-3, Oxygen Analyzer and Brown ElectroniK Recorder-Data Sheet No. 10. 15-11.

FOR A FREE COPY CIRCLE REPLY CARD NO. 26

Carbide Inserts

Viking Tool Co.'s new and improved catalog describes and illustrates its complete line of metal cutting tools—44 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 27

Tungsten

Sylvania Electric Products Inc. covers the manufacture, properties and uses of tungsten and how they make and quality-control the material—18 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 28

Forging Design

Globe Forge Inc. offers a guide on basic forging design, with suggestions on use of current forging practices.

FOR A FREE COPY CIRCLE REPLY CARD NO. 29

Diffusion Pumps

Naresco Equipment Corp., equipment sales subsidiary, National Research Corp., describes a complete line of diffusion pumps.

FOR A FREE COPY CIRCLE REPLY CARD NO. 30

Materials Handling

Elizabeth Iron Works Inc. describes its line of materials handling equipment. A formula for determining span of gap and height differential between car and floor platform is given.

FOR A FREE COPY CIRCLE REPLY CARD NO. 31

Magnet Wire

Anaconda Wire & Cable Co. has rewritten a section of its catalog on magnet wire to incorporate all changes under ASTM & NEMA Standards. High temperature insulation section is expanded to include recent developments—Catalog No. C-79-12.

FOR A FREE COPY CIRCLE REPLY CARD NO. 32

Time Delay Relay

AGA Division, Elastic Stop Nut Corp., describes a time delay relay with a double-throw auxiliary switch. It allows push-button operation, instant or delayed contacts after de-energization—Bulletin SR-6, 2 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 33

Drafting Standards

Aluminum Association offers a revised edition of "Drafting Standards—Aluminum Extruded and Tubular Products."

FOR A FREE COPY CIRCLE REPLY CARD NO. 34

Centrifugal Blowers, Exhausters

Air Appliance Division, U. S. Hoffman Machinery Corp., has prepared a bulletin on the design, types and advantages of multistage centrifugal blowers and exhausters —Bulletin M-103, 12 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 35

Carbon Control

Leeds & Northrup Co.'s "Microcarb Atmosphere Control for Control of Carbon Potential in Homocarb Furnaces" goes into prin-

For free literature, editorial clips or more information on products described in this section, circle the corresponding number at left. Fill in box below for articles or advertisements not numbered.

ARTICLE OR ADVERTISEMENT	PAGE

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COMPANY _____

PRODUCTS MANUFACTURED _____

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4	14	24	34	44	54	64	74	84
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7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
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ciples and how to use method—12 pages.

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Machining Tool Steels

Vanadium-Alloys Steel Co. outlines the uses, compositions, heat treatment costs and methods of ordering free machining high speed and die steels—6 pages.

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Cylinder Automation

Miller Fluid Power Co. suggests "A Cylinder Program for Automation and Heavy Duty Service"—12 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 38

Metal Cleaning

Metalwash Machinery Corp.'s current house organ features an article titled, "Preparation of Metal Surfaces for Paint."

FOR A FREE COPY CIRCLE REPLY CARD NO. 39

Shaft Mounted Drives

Falk Corp. gives design data, selection tables, dimensions, weights and installation photos on shaft-mounted gear drives—Bulletin 7101, 7 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 40

Wheel Grinders

Landis Tool Co. gives specifications on 10 and 14 in. multiple wheel grinders that grind diameters simultaneously—Catalog P-54, 11 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 41

Drilling, Tapping

Bodine Corp. gives 12 case histories to illustrate how its automatic equipment for tapping, milling, screw inserting and assembly of small parts is utilized.

FOR A FREE COPY CIRCLE REPLY CARD NO. 42

Measuring, Control Equipment

Simplex Valve & Meter Co. illustrates different types of control and measuring equipment on both primary and secondary measuring devices—Bulletin 050, 4 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 43

Micro-Hardness

William J. Hacker & Co. Inc. offers "Micro-Hardness, Its Theory and Practice with Reichert Micro-Hardness Tester"—48 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 44

Testing Machine

Robert Holmes & Bros. Inc. describe in detail their float-sink testing machine—4 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 45

Forging

Earle H. Jorgenson Co. lists diversified items of open and closed-die forging equipment and the nature of the products that can be produced—4 pages.

FOR A FREE COPY CIRCLE REPLY CARD NO. 46

EDITORIAL REPRINTS

The Foreman

Progressive management is putting the foreman back on the management team. Years ago, the plant owner was king of the industrial enterprise, the foreman his feudal lord. Since the start of the labor movement, the foreman has gradually lost authority. In many plants he's merely a middleman who's not quite sure where he stands. With the renewed emphasis on competition, the foreman is again being looked on as a key man. Number 9 in STEEL's Management Series, p. 30.

FOR A FREE COPY CIRCLE REPLY CARD NO. 47

Forging

As a material saver, as a time saver and as a device for actually improving product quality, forging has taken a place on the production line. On p. 118 you'll find some of its jobs.

FOR A FREE COPY CIRCLE REPLY CARD NO. 48

Valve Coating

Aluminum coating process promises longer life for automobile engine valves. Pontiac is coating valves now. Others will have them on 1955 models. Here's a discussion of the process. P. 114.

FOR A FREE COPY CIRCLE REPLY CARD NO. 49

Automobile Expense

Here's an article, p. 67, telling you you can save on automobile expense. Fleet leasing may offer you economies over outright ownership of cars or mileage allowances.

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4	14	24	34	44	54	64	74	84
5	15	25	35	45	55	65	75	85
6	16	26	36	46	56	66	76	86
7	17	27	37	47	57	67	77	87
8	18	28	38	48	58	68	78	88
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10-11-54

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STEEL
October 11, 1954

Market Outlook

STEEL INGOT production rose to within 4 points of this year's high point. It reached 71 per cent of capacity in the week ended Oct. 10. This marked the fourth consecutive week of increase. In the latest week the rise was 2.5 points over the preceding week, making the gain in the last month 7.5 points.

To step up production, steel companies put more furnaces into operation, recalled men to work and increased the work week.

THE STIMULANT—The upturn stems from a partial resumption of buying by automobile producers and from the tapering off of inventory reductions. Most steel users have whittled their inventories of materials down to desired levels. Now they at least have to buy for current use.

THE RESULT—As demand for steel strengthens, delivery times on some products are becoming extended into the future. This is true particularly in the forms of steel, such as light flat-rolled products, used by the automobile industry. The time is nearer when consumers cannot dictate times of shipment. Delivery of cold-rolled carbon steel sheets now take five to six weeks, and hot-rolled carbon sheets, three to four weeks. Tightest of all steel products, however, are galvanized sheets, particularly those from continuous hot-dipping lines. Most sellers of this continuous product are booked well into December; one Midwest producer is now quoting February delivery.

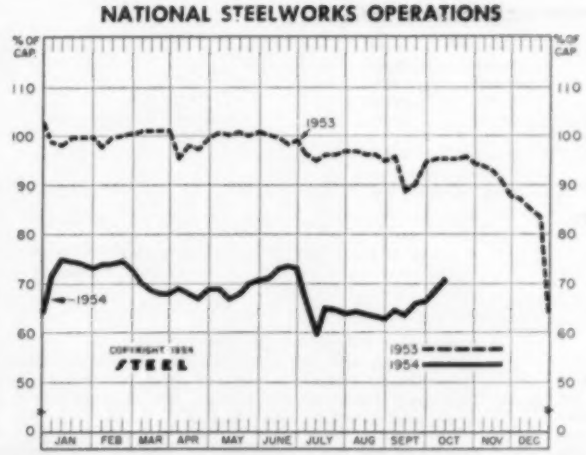
SLOW UPTAKE—Demand for steel bars is quickening somewhat because of new model activity at automobile plants. This is the only area from which a pickup has come for bars. Farm implements, important users of bars, are running well below capacity. For a number of implement companies, Oct. 31 ends the fiscal year. Their policy is to restrict purchases and convert all possible raw materials into finished product. Better bar buying in November and December is likely.

FREE AND EASY—Plates are in free supply and structural shapes are fairly easy to get, too. The construction industry is providing the bulk of demand for these two products. Contributing to the slack in plate and shape business is the low rate of railroad freight car construction. Carbon steel plates can be had from the mill in a week or two. Award of a $160-million combat tank contract to the Newark, Del., plant of Chrysler Corp. holds promise of substantial buying of high tensile armor plate, steel castings and a variety of other steel products.

COUNTERMOVE—Even though the steel production rate has risen, there's enough idle mill capacity to keep keen competition alive. Because mills have aggressively sought customers, jobbers have seen some of their business taken away. As a countermove, jobbers have increased their quantity discounts on various steel products $2 to $4 a ton.

PRICE TRENDS—In contrast, STEEL's price composite on finished steel edged up to $117.95 a net ton, an 18-cent increase resulting from a rise in tin mill product prices Oct. 1. STEEL's scrap price composite advanced to $32.00 a gross ton, high point of this year. The scrap rise stems from export demand and the strengthening in domestic steel production.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage in capacity engaged)

	Week Ended Oct. 10	Change	Same Week 1953	Same Week 1952
Pittsburgh	69.5	+ 0.5*	97.5	106
Chicago	72	+ 1*	97.5	106.5
Mid-Atlantic	63	+ 5	97	98
Youngstown	62	+ 5	105	106
Wheeling	86.5	0	97	99.5
Cleveland	77.5	0	101	107
Buffalo	68	+ 2	106.5	106.5
Birmingham	71	0	96.5	102
New England	52	+ 4	80	95
Cincinnati	66	+ 2	84	90
St. Louis	69	0	103	108
Detroit	76	+ 1	100	111
Western	87	0	102	100
National Rate	71	+ 2.5	95	104.5

INGOT PRODUCTION‡

	Week Ended Oct. 10	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	104.5†	104.5†	93.5	133.6
NET TONS (In thousands)	1,678†	1,678	1,502	2,146

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,384,549 in 1954; 2,254,459 in 1953; 2,077,040 in 1952.

Metalworking Outlook—p. 55 Technical Outlook—p. 113

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Oct. 5 1954	Sept. 28 1954	Month Ago	Sept. Average
(1947-1949=100)	144.7	144.6	144.5	144.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 5

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them write to STEEL.

Rails, standard, No. 1	$4.525	Sheets, electrical	$0.350
Rails, light, 40 lb	5.917	Strip, C.R., carbon	7.507
Tie Plates	5.275	Strip, C.R., stainless, 430 (lb)	0.415
Axles, railway	7.560	Strip, H.R., carbon	5.125
Wheels, freight car, 33 in. (per wheel)	48.500	Pipe, black, buttweld (100 ft)	15.000
Plates, carbon	4.675	Pipe, galv., buttweld (100 ft)	18.605
Structural Shapes	4.517	Pipe, line (100 ft)	146.804
Bars, tool steel, carbon (lb)	0.430	Casing, oil well, carbon (100 ft)	154.216
Bars, tool steel, alloy, oil hardening die (lb)	0.525	Casing, oil well, alloy (100 ft)	227.875
Bars, tool steel, H.R., alloy, high speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.80 (lb)	1.115	Tubes, boiler (100 ft)	‡
Bars, tool steel, H.R., alloy, high speed W 18, Cr 4 V 1 (lb)	1.610	Tubing, mechanical, carbon	‡
Bars, H.R., alloy	8.775	Tubing, mechanical, stainless, 304 (100 ft)	161.193
Bars, H.R., stainless, 303 (lb)	0.418	Tin plate, hot-dipped, 1.25 lb	8.533
Bars, H.R., carbon	5.000	Tin plate, electrolytic, 0.25 lb	7.223
Bars, reinforcing	5.050	Black plate, can making quality	6.333
Bars, C.F., carbon	8.160	Wire, drawn, carbon	7.938
Bars, C.F., alloy	11.275	Wire, drawn, stainless, 430 (lb)	0.545
Bars, C.F., stainless, 302 (lb)	0.433	Bale ties (bundle)	5.860
Sheets, H.R., carbon	4.880	Nails, wire, 8d common	7.815
Sheets, C.R., carbon	5.871	Wire, barbed (80-rod spool)	7.109
Sheets, galvanized	7.220	Woven wire fence (20-rod roll)	16.815
Sheets, C.R., stainless, 302 (lb)	0.548		

‡Not available.

STEEL's FINISHED STEEL PRICE INDEX*

	Oct. 6 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	194.53	194.19	194.19	189.38	152.52
Index in cents per lb.	5.270	5.261	5.261	5.130	4.132

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$117.95	$117.77	$117.77	$115.56	$91.55
No. 2 Fdry, Pig Iron, GT	56.54	56.54	56.54	56.54	46.10
Basic Pig Iron, GT	56.04	56.04	56.04	56.04	45.60
Malleable Pig Iron, GT	57.27	57.27	57.27	57.27	47.27
Steelmaking Scrap, GT	32.00	30.50	29.75	31.83	27.25

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Oct. 6 1954	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.30	4.30	4.30	4.15	3.35
Bars, H.R., Chicago	4.30	4.30	4.30	4.15	3.35
Bars, H.R., del. Philadelphia	4.55	4.55	4.55	5.302	3.43
Bars, C.F., Pittsburgh	5.40	5.40	5.40	5.20	3.95-4.00
Shapes, Std., Pittsburgh	4.25	4.25	4.25	4.10	3.25
Shapes, Std., Chicago	4.25	4.25	4.25	4.10	3.25
Shapes, del., Philadelphia	4.53	4.53	4.53	4.38	3.50
Plates, Pittsburgh	4.225	4.225	4.225	4.10	3.40
Plates, Chicago	4.225	4.225	4.225	4.10	3.40
Plates, Coatesville, Pa.	4.225	4.225	4.225	4.35	3.50
Plates, Sparrows Point, Md.	4.225	4.225	4.225	4.10	3.40
Plates, Claymont, Del.	4.225	4.225	4.225	4.55	3.50
Sheets, H.R., Pittsburgh	4.05	4.05	4.05	3.925	3.25
Sheets, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Sheets, C.R., Pittsburgh	4.95	4.95	4.95	4.775	4.00
Sheets, C.R., Chicago	4.95	4.95	4.96	4.775	4.00
Sheets, C.R., Detroit	5.10	5.10	5.10	4.975	4.20
Sheets, Galv., Pittsburgh	5.45	5.45	5.45	5.275	4.40
Strip, H.R., Pitts.	4.05	4.05	4.05	4.025	3.25
Strip, H.R., Chicago	4.05	4.05	4.05	3.925	3.25
Strip, C.R., Pittsburgh	5.75	5.75	5.75	5.45-5.65	4.00
Strip, C.R., Chicago	6.00	6.00	6.00	5.70	4.00-4.15
Strip, C.R., Detroit	5.60-.90	5.60-.90	5.60-.90	5.45-6.05	4.20-.25
Wire, Basic, Pitts.	5.75	5.75	5.75	5.475-5.525	4.15
Nails, Wire, Pittsburgh	6.45	6.45	6.45	6.35-6.55	5.15
Tin plate (1.50 lb), box, Pitts.	$9.05	$8.95	$8.95	$8.95	$7.75
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$78.00	$78.00	$78.00	$75.50	$61.00
Wire rods, $\frac{7}{32}$-$\frac{1}{2}$" Pitts.	4.675	4.675	4.675	4.525	3.40
PIG IRON, Gross Ton					
Bessemer, Pitts.	$57.00	$57.00	$57.00	$57.00	$47.00
Basic, Valley	56.00	56.00	56.00	56.00	46.00
Basic, deld. Phila.	59.66	49.66	49.66	60.75	49.44
No. 2 Fdry, Pitts.	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Chicago	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, Valley	56.50	56.50	56.50	56.50	46.50
No. 2 Fdry, del. Phila.	50.16	50.16	50.16	61.25	49.94
No. 2 Fdry, Birm.	52.88	52.88	52.88	52.88	39.38
No. 2 Fdry (Birm.) del. Cin.	60.62	60.62	60.62	60.43	45.43
Malleable, Valley	56.50	56.50	56.50	56.50	46.50
Malleable, Chicago	56.50	56.50	56.50	56.50	46.50
Ferromanganese, Duquesne	190.00†	190.00†	190.00†	200.00†	175.00*

*75-82% Mn, gross ton, Etna, Pa. †74-76% Mn, net ton.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pitts.	$32.50	$30.50	$30.50	$34.50	$29.75
No. 1 Heavy Melt, E. Pa.	30.50	29.00	28.75	31.50	25.00
No. 1 Heavy Melt, Chicago	33.00	32.00	30.00	29.50	27.00
No. 1 Heavy Melt, Valley	33.00	32.50	30.50	33.50	31.25
No. 1 Heavy Melt, Cleve.	32.00	30.50	28.50	30.50	26.50
No. 1 Heavy Melt, Buffalo	30.50	28.50	26.50	33.50	28.25
Rails, Rerolling, Chicago	51.50	51.50	44.50	42.50	41.50
No. 1 Cast, Chicago	39.50	38.50	35.50	32.50	41.50
COKE, Net Ton					
Beehive, Furn, Connlsvl.	$13.75	$14.75	$14.75	$14.75	$13.25
Beehive, Fdry, Connlsvl.	16.75	16.75	16.75	16.75	15.75
Oven Fdry, Chicago	24.50	24.50	24.50	24.50	20.00

Daily Nonferrous Price Record

	Price Oct. 6	Last Change	Previous Price	Sept. Avg.	Aug. Avg.	Oct. 1953 Avg.
Copper	30.00	Apr. 12	29.75-30.00	30.000	30.000	29.606
Lead	14.80	Oct. 4	14.55	14.400	13.846	13.300
Zinc	11.50	Sept. 3	11.00	11.900	11.000	10.000
Tin	93.375	Oct. 6	93.25	93.545	93.332	81.096
Nickel	60.00	Jan. 14, 1953	56.50	60.000	60.000	60.000
Aluminum	22.20	Aug. 5, 1954	21.50	22.200	22.119	21.500
Magnesium	27.00	Mar. 9, 1953	24.50	27.000	27.000	27.000

Quotations in cents per pound based on: Copper, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Nickel, electrolytic cathodes, 99.9%, base size at refinery unpacked; Aluminum, primary ingots, 99+ %, del.; Magnesium 99.8%, Freeport, Tex.

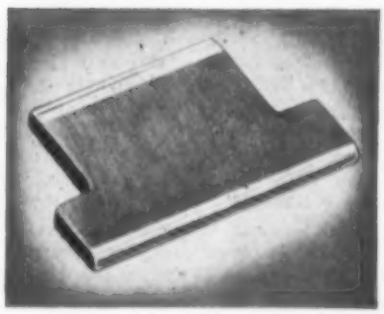
What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**

Why wait?
CUT YOUR COSTS NOW!

let the leading manufacturer of broaching equipment show you how to lower your break-even costs.

TEN TIMES FASTER than previous methods —broaching top and bottom radii on these automatic transmission reverse band anchors is helping one manufacturer lower the break-even costs. The design called for both edges to be rounded with a taper leading into one of the rounded edges. Besides increasing production by 10 times, the broached surfaces are more accurate, and costs are kept to a minimum. Thousands of these band anchors are being machined between broach sharpenings.

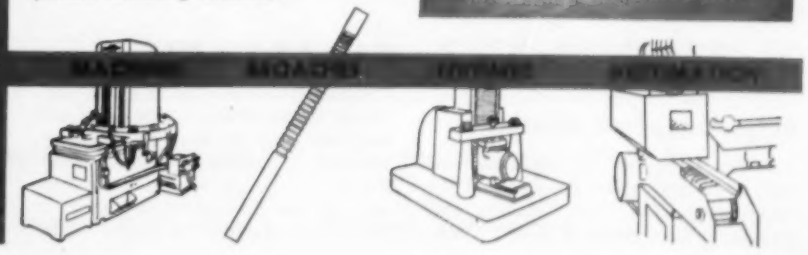


THIRTY TIMES FASTER than milling—broaching lowers costs in the production of the intricate shapes of these copper breaker points. Seven pieces at a time are broached at a rate 30 times faster than by milling. 75,000 pieces are completed before it is necessary to sharpen the broach. 800 to 1000 pieces per hour are broached on one Colonial machine with only two sets of Colonial broaches.

TWENTY TIMES FASTER than other methods —the serrations on the end of this shaft are cut with a button broach in a single pass. Cost per part is reduced substantially because broaching is 20 times faster. This, and hundreds of other applications on file at Colonial, are ample testimony of the tremendous cost-cutting potential that can be yours by utilizing "Unified Broaching" by Colonial. Send us prints of your parts—let us show you how to cut costs over your present machining methods.

Unified Broaching

COLONIAL



Nonferrous Metals

Surge in foreign markets pushes spot copper to 40 cents lb. Rise stems from strikes. All U. S. users won't feel it, but those buying small lots of spot metal will

Nonferrous Metal Prices, Pages 172 & 173

REMEMBER WHEN price controls ended in early 1953 and copper sold for as much as 36.50 cents a pound? History is repeating and even outdoing itself now.

A violent surge in markets abroad has pushed spot copper prices to the equivalent of 40 cents lb, highest since the London Metal Exchange reopened last year. Contributing factors are losses due to mine strikes in the U. S. and Chile, production problems in Rhodesia and shipping strikes in London and New York. Commodity exchange quotations have spurted to more than 5 cents a pound above producers' prices, and the higher rates on forward buying extend into next September.

Repercussions—What does this mean to American fabricators? Those with established sources of copper from going U. S. mines still need pay only 30 cents lb for the red metal. Long-term competitive considerations should preclude abandonment of that price line. But if you buy small lots of spot copper from a dealer or broker, you'll pay a stiff premium.

Problems of the big users of copper, such as brass and wire mills, are becoming more acute. Reserves of usable metal range from less than a week to one month, and in some plants shutdown plans are now being drawn.

Help Coming—Strikes in the West are on the verge of solution, but 90 days is needed to get copper from ore to market. In Chile, Braden Copper Co. settled its labor troubles by granting a 26-per-cent wage increase. The estimated additional cost of $9 million will be offset by allowing the company to buy pesos at the free bank exchange rate of 110 per dollar as against the 19.3 per dollar previously allowed.

Once labor peace is restored, chances for government diversion of stockpile deliveries to fabricators will improve markedly. Even so, there will be some hungry days ahead.

Copper Scrap Feels Inflation

Under OPS, No. 1 copper scrap had a ceiling price fixed at 19.25 cents per pound. Today dealers are getting 6 to 7 cents a pound more for that grade, and even further advances are possible. Custom smelters provide the inflationary impetus. Exporters were expected to re-enter the buying market in force about this time, but pressure is being brought on the government to sharply curtail export licenses. Small ingot-makers, the so-called "bucket shops," are out of the market, preferring to export their scrap to selling ingot metal. Even ingot prices are nominal in places.

STEEL's Metal Price Averages for Sept., 1954

(Cents per pound)

Electrolytic Copper, del. Conn.	30.000
Lead, St. Louis	14.400
Prime Western Zinc, E. St. Louis	11.900
Straits Tin, New York	93.545
Primary Aluminum Ingots, del.	22.200
Magnesium, Freeport, Tex.	27.00
Nickel, f.o.b. refinery	60.000

Kennecott Looks Abroad

Kennecott Copper Corp. served notice it is gunning for European customers for copper again. "Kennecott is once again becoming a factor in the European copper market and recapturing some of its former business," said E. S. Hann, treasurer, to Boston Security Analysts. "So far this year good tonnages of our Chilean copper have been sold in Great Britain and to continental buyers. We intend to concentrate our sales efforts in the foreign field, looking toward re-establishing our Braden copper to the prominence it formerly enjoyed."

Nickel: Relief Far Off

Nickel will continue in short supply at least through this year and well into 1955. So says H. A. Berry, Ingersoll Products Division, Borg-Warner Corp., in the monthly bulletin of the National Association of Purchasing Agents. "It seems natural, based on the extremely high rate of nickel used in defense products and the continued designing of more nickel, that the Office of Defense Mobilization has no alternative except stockpiling at a rapid rate. Coupled to this need is a fear of suddenly reduced supplies in the event of hostilities, as the greater share of the free world's supply is concentrated by nature in the Sudbury area and refining capacity, while already being concentrated in one area of Canada, is being expanded in the same area."

Canadian, Cuban and U. S. expansions will add 17,000 tons more nickel capacity this year, says Mr. Berry. He also notes a desire on the part of scrap men to reduce scrapped alloy to ingots and stockpile it as such rather than to try to separate the elements of the alloy.

Lead Price Rises

Between pressures of stockpile buying and London speculation, lead prices did as expected last week, rising a quarter-cent to 15.00 cents per pound, New York, highest level in two years and 2.5 cents above the 1954 low set in February.

Domestic demand has little to do with it—consumption is running about 10 per cent under last year. Battery makers are the biggest users, normally buying two-thirds of their needs in the last half of the year. In 1954 their orders are 16 per cent lighter than last year.

Defense Buying Will Shrink

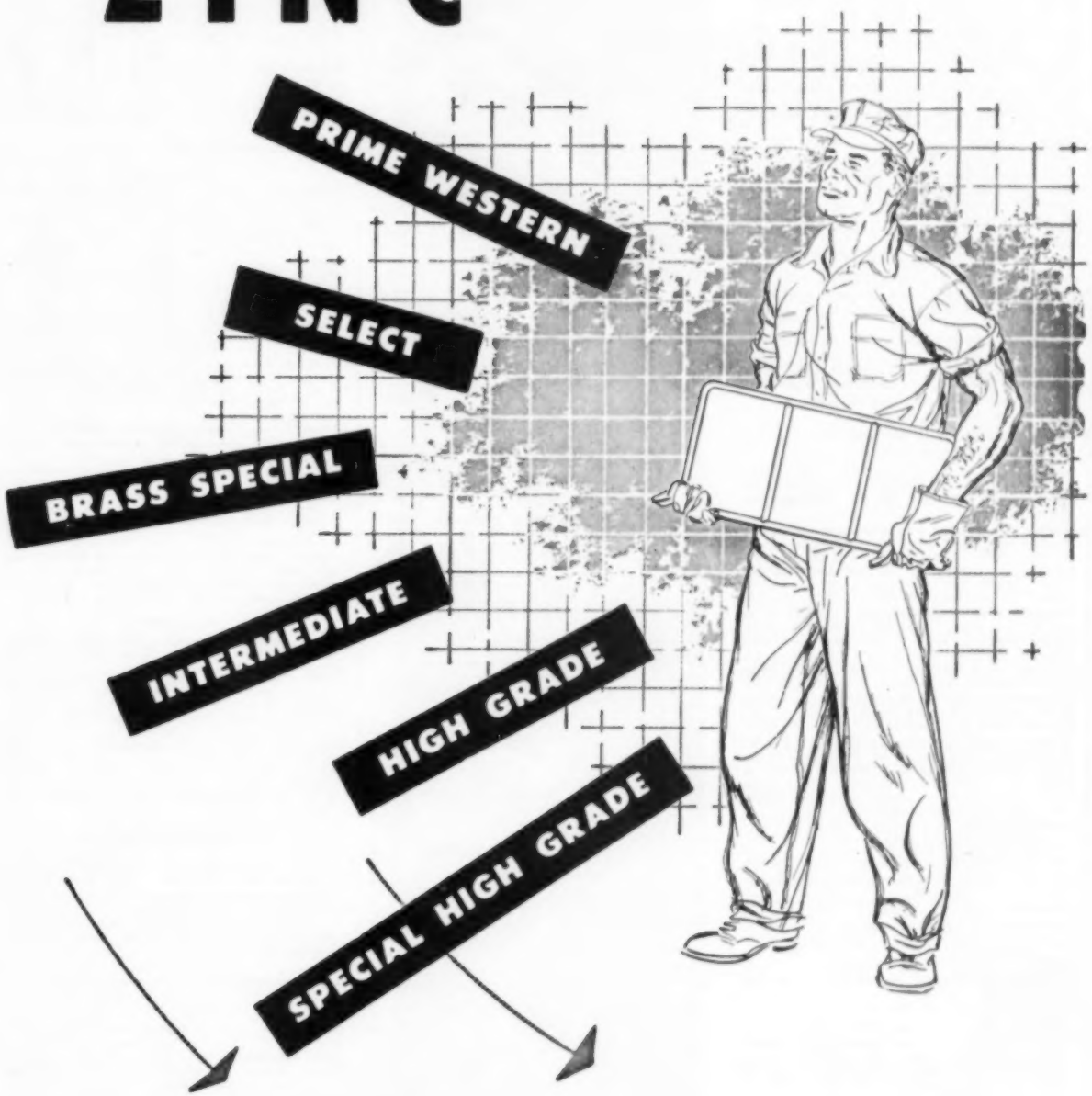
Defense department purchases of nonferrous metals are slated to be lower in the fourth quarter than in the third, and about 50 per cent of first-half buying. Aluminum purchases are scheduled at 100,000 lb, copper wire mill products at 13,000 lb, brass mill products at 50,000 lb and copper foundry products at 5000 lb.

Market Memos

- Steel pickup is dragging zinc buying with it as galvanizers' orders make up for dullness in brass mills and diecasters' buying. Stockpile buying keeps the price firm.
- Kennecott Copper Corp.'s equity in Kaiser Aluminum & Chemical Co. is fixed at 13 per cent if all preferred stock were converted to common.

SLAB ZINC

every grade of ZINC
for urgent military and
civilian requirements



AMERICAN ZINC SALES COMPANY

Distributors for

AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, O. Chicago St. Louis New York

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 22.20, pigs 20.50 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 24; No. 43, 5% Si, 23.5; No. 142, 4% Cu, 25.1; No. 195, 4.5% Cu, 0.8% Si, 24.5; No. 214, 3.5% Mg, 25.3; No. 356, 7% Si, 0.3% Mg, 23.9.

Antimony: R.M.M. brand, 99.5% 28.50, Lone Star brand, 29.00, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00 New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $72.75 per lb of contained Be, f.o.b. Reading, Pa.; Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $40.00 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa. or Elmore, O.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb del.

Cobalt: 97-99%, $2.60 per lb for 550 lb keg; $2.62 per lb for 100 lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $75.00 per lb, nom.

Copper: Electrolytic 30.00 del. Conn. Valley, 30.00 del. Midwest; Lake 30.00 del; Fire refined 29.75 del.

Germanium: 99.9%, $395 per lb, nom.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $145-$150 per troy oz.

Lead: Common 14.80, chemical 14.90, corroding 14.90, St. Louis; N. Y. basis, add 0.20.

Lithium: 98%, $11-$14 per lb, depending on quantity.

Magnesium: 99.8%, self-palletizing pig 27.00; notched ingot 27.75, 10,000 lb or more, f.o.b. Freeport, Tex. For Port Newark, N. J., and Madison, Ill., add 1.20 for pig and 1.25 for ingot. Sticks, 1.3 in. diameter, 46.00, 100 to 4999 lb, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91C and alloys C, H, G and R 32.50; alloy M 34.50, 10,000 lb or more f.o.b. Freeport, Tex., or Madison, Ill. Add 1.20 for Port Newark, N. J.

Mercury: Open market, spot, New York, $320-$325, nom., per 76-lb flask.

Molybdenum: Powder 99% hydrogen reduced $3.40 per lb; pressed ingot $4.06 per lb; sintered ingot $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked 60.00; 25-lb pigs 62.65; "XX" nickel shot 63.65; "F" nickel shot or ingots for addition to cast iron, 60.00; prices f.o.b. Port Colborne, Ont., including import duty, New York basis, add 0.92.

Osmium: $140-$150 per troy oz nom.

Palladium: $21 per troy oz.

Platinum: $84-$87 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $125 per troy oz.

Ruthenium: $75-$80 per troy oz.

Selenium: 99.5%, $5-$6 per lb.

Sodium: 16.50, carlots; 17.00 l.c.l.

Tantalum: Sheet, rod $39.00 per lb; powder $33.50 per lb.

Tellurium: $1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot and prompt, 93.375.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max) $4.72; grade A-2 (0.5% Fe max) $4.46 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000 lb lots $4.95 per lb, f.o.b. shipping point; less than 1000 lb $5.10 99+% hydrogen reduced, $4.65. Treated ingots $6.70.

Zinc: Prime Western 11.50, brass special 11.75, intermediate 12.00, E. St. Louis, freight allowed over 0.50 per pound. High grade 12.85, special high grade 13.00, die casting alloy ingot 15.50, del.

Zirconium: Sponge $10 per lb; powder electronics grade $15, flash grade $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloy 21.25-21.75; No. 12 foundry alloy (No. 2 grade) 20.25-20.75; 5% silicon alloy, 0.60 Cu max., 23.75-24.00; 13 alloy, 0.60 Cu max., 23.75-24.00; 195 alloy 21.75-22.75; 108 alloy 20.75-21.25; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 21.50-22.00; grade 2, 20.50-21.00; grade 3, 19.50-20.00; grade 4, 18.50-19.00.

Brass Ingot: Red brass, No. 115, 28.50; tin bronze No. 225, 40.00; No. 245, 33.75; high-leaded tin bronze, No. 305, 33.00; No. 1 yellow, No. 405, 24.25; manganese bronze No. 421, 26.75.

Magnesium Alloy Ingot: AZ63A, 31.50; AZ91B, 27.00; AZ91C, 31.50; AZ92A, 31.50.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.65; rod, bar, wire, $1.65.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 100,000 lb lots, 35.36; 30,000 lb lots, 35.48; l.c.l. 35.98. Weatherproof, 100,000 lb, 34.26; 30,000 lb, 36.53; l.c.l. 37.03. Magnet wire del., 15,000 lb or more 41.53; l.c.l. 42.58.

LEAD

(Prices to jobbers f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more $20.00 per cwt; pipe, full coils $20.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $15; sheared mill plate, $12; strip, $15; wire, $11; forging billets $6; hot-rolled and forged bars, $6.

ZINC

(Prices per lb c.l., f.o.b. mill) Sheets 23.00, ribbon zinc in coils, 18.50-20.50; plates 18.00-22.25.

ZIRCONIUM

Plate $27; H.R. strip $28; C.R. strip $35; forged or H.R. bars $27; wire, 0.015 in., 1 cent per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheet, C.R.	86.5	67.5	92.5
Strip, C.R.	92.5	70.5	95.5
Plate, H.R.	84.5	66.5	90.5
Rod, Shapes	82.5	65.5	88.5
Seamless Tubes	115.5	100.5	127.5
Shot, Blocks	...	60.0	...

ALUMINUM*

Screw Machine Stock: 5000 lb and over.

Dia. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	62.5	61.0	...	...
0.156-0.172	52.9	51.3	...	...
0.188	52.9	51.3	...	45.8
0.219-0.234	50.1	48.5	...	...
0.250-0.281	50.1	48.5	...	42.7
0.313	50.1	48.5	...	39.8
Cold-finished				
0.375-0.547	48.9	46.5	58.8	56.2
0.563-0.688	48.9	46.5	55.9	52.7
0.750-1.000	47.7	45.3	51.1	49.6
1.063	47.7	45.3	...	47.9
1.125-1.500	45.9	43.6	49.4	47.9
Rolled				
1.563	44.7	42.4	...	...
1.625-2.000	44.1	41.8	...	46.2
2.125-2.500	43.0	40.7	...	...
2.563-3.375	41.7	39.5	...	...

ALUMINUM*

Sheets and Circles: 1100 and 3003 mill finish c.l. (30,000 lb base; freight allowed over 499 lb)

Thickness Range Inches	Widths or Diameters, In., Inc.	Flat Sheet*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	12-48	34.9	...	...
0.135-0.096	12-48	35.4	...	...
0.095-0.077	12-48	36.1	33.6	38.6
0.076-0.061	12-48	36.7	33.8	38.8
0.060-0.048	12-48	37.2	34.1	39.2
0.047-0.038	12-48	37.7	34.6	39.6
0.037-0.030	12-48	38.1	35.0	40.3
0.029-0.024	12-48	38.7	35.3	40.8
0.023-0.019	12-36	39.4	36.1	41.6
0.018-0.017	12-36	40.2	36.7	42.5
0.016-0.015	12-36	41.1	37.5	43.7
0.014	12-24	42.1	38.5	45.0
0.013-0.012	12-24	43.3	39.2	46.0
0.011	12-24	44.3	40.4	47.6
0.010-0.0095	12-24	45.5	41.5	49.2
0.009-0.0085	12-24	46.8	43.0	51.3
0.008-0.0075	12-24	48.4	44.2	53.1
0.007	12-18	49.9	45.7	55.4
0.006	12-18	51.5	47.1	58.4

*72-180 in. lengths. †26 in. max. dia.

ALUMINUM*

Plates and Circles: Thickness 0.250-3.0 in., 24-60 in. width or dia., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	34.7	38.9
5050-F	34.7	38.9
3004-F	35.7	40.6
5052-F	37.4	42.4
6061-T6	38.6	43.0
2024-T4*	40.8	46.9
7075-T6*	48.6	55.2

*24-48 in. widths or dia., 72-180 in. lengths.

ALUMINUM*

Forging Stock: Round, Class 1, 46.8-36.3, in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 52.6-40 in random lengths 0.375-4.0 in. thick, widths 0.750-10.0 in.

Pipe: A.S.A. Schedule 40, alloy 6063-T6, 20 ft length, plain ends, 90,000 lb base, per 100 ft.

Nom. pipe size, in.		Nom. pipe size, in.	
¾	$15.70	2	$ 48.30
1	24.75	4	132.90
1¼	23.50	6	238.35
1½	40.05	8	358.60

*Alloy designations are standard for use on and after Oct. 1, 1954. To relate them to designations used prior to that time, see STEEL, Aug. 9, 1954, p. 95.

MAGNESIUM

Sheet: AZ31, commercial grade, 0.032-in. 94.00, 0.064-in. 73.00, 0.125-in. 60.00, 30,000 lb and over, f.o.b. mill.

Plate: Hot rolled AZ31, 53.00, 20,000 lb or more 0.250-in. and over, widths to 48 in., lengths to 144 in.; raised pattern floor plate, 59.00, 20,000 lb or more, ¼-in. thick, widths 24-72 in., lengths 60-192 in.

Extrusion Stock: AZ31, Rectangles, ¼ x 2 in. 69.20, 1 x 4 in. 63.00. Rod, 1 in. 66.00, 2 in. 62.50. Tubing, 1 in. OD x 0.065-in., 87.00. Angles, 1 x 1 x ⅛-in. 72.90, 2 x 2 x ¼-in. 67.00. Channels, 5 in. 67.80. I-Beams, 5 in. 68.20.

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 28 clippings 14.00; low copper clippings 14.00; mixed clippings 12.00; old sheet 11.00; borings and turnings 7.00; pistons and struts 8.50; crankcases 11.00; industrial castings 11.00.

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	48.38b	45.98c	....	48.44	26.000	26.000	25.250
Yellow Brass	41.72	34.50d	42.26	44.63	19.750	19.500	18.000
Red Brass, 85%	45.44	45.38	45.98	48.25	23.000	22.750	22.250
Low Brass, 80%	44.47	44.41	45.01	47.28	22.125	21.875	21.375
Naval Brass	45.76	40.07	52.80	48.92	18.250	18.000	17.500
Commercial Bronze, 90%	46.95	46.89	47.49	49.51	23.475	23.625	23.125
Nickel Silver, 10%	55.36	59.43g	57.69	....	23.625	23.375	11.813
Phosphor Bronze, A, 5%	66.55	67.06	67.06	68.23	26.125	25.875	24.875
Silicon Bronze	52.71	51.90	52.75	70.11e	25.125	24.875	24.125
Manganese Bronze	49.45	43.62	54.06	....	18.250	18.000	17.500
Munts Metal	43.96	39.77	....	....	18.625	18.375	17.875

a. Cents per lb f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 pounds, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded.

Copper and Brass: Heavy copper and wire, No. 1 25.75-26.25; No. 2 copper 24.25-24.75; light copper 22.25-22.75; No. 1 composition red brass 19.50; No. 1 composition turnings 19.00; mixed brass turnings 12.50; new brass clippings 18.00; No. 1 brass rod turnings 15.00; light brass 12.00; heavy yellow brass 15.00; new brass rod ends 16.00; auto radiators, unsweated 16.00; cocks and faucets 16.50; brass pipe 17.00.

Lead: Heavy 11.75-12.00; battery plate 6.25-6.50; linotype and stereotype 13.75-14.00; electrotype 12.00-12.50; mixed babbitt 12.50-13.00.

Magnesium: Clippings 18.50-19.50; clean castings 17.50-18.50; iron castings, not over 10% removable Fe, 16.50-17.50.

Monel: Clippings 23.00-25.00; old sheet 21.00-23.00; turnings 16.00-18.00; rods 23.00-25.00.

Nickel: Sheets and clips 60.00-65.00; rolled anodes 60.00-65.00; turnings 40.00; rod ends 60.00-65.00.

Tin: No. 1 pewter 55.00-60.00; block tin pipe 75.00-80.00; No. 1 babbitt 50.00.

Zinc: Old zinc, 5.00-5.25; new die cast scrap, 4.75-5.00; old die cast scrap, 3.25-3.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 28, 38 clippings 16.00-16.25; 518, 528 clippings 16.00-16.25; 148, 178, 248 clippings 15.25-15.50; mixed clipping 14.75-15.00; old sheet 14.00-14.25; old cas. 14.00-14.25; clean old cable, free of steel 16.00-16.25; borings and turnings 14.25-14.75.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 42.00; light scrap 37.00.

Copper, Brass: No. 1 copper 28.50; No. 2 copper 27.00; light copper 25.50; refinery brass (60% copper) per dry copper content 25.00-25.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper, Brass: No. 1 copper 27.50-28.00; No. 2 copper 26.00-26.50; light copper 24.50-25.00; No. 1 composition borings 22.00; No. 1 composition solids 22.50; heavy yellow brass solids 17.50-18.00; yellow brass turnings 16.50-17.00; radiators 18.75.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes $1.70 per lb.

Copper: Flat-rolled 45.04, oval 44.54, 2000-5000 lb; electrodeposited 39.78, cast 42.04, 5000-10,000 lb lots.

Nickel: Depolarized, less than 500 lb 92.00; 500-4999 lb 88.00; over 5000 lb 86.00.

Tin: Bar or slab, less than 200 lb $1.115; 200-499 lb $1.10; 500-999 lb $1.095; 1000 lb or more $1.09.

Zinc: Bar 18.50, bar or flat top 17.50 ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100 lb drums.

Chromic Acid: Less than 10,000 lb 28.50; over 10,000 lb 27.50.

Copper Cyanide: Under 1000 lb 63.90, 1000 lb and over 61.90.

Copper Sulphate: 100-6000 lb 11.35; 6000-12,000 lb 11.10; 12,000-24,000 lb 10.85; 24,000-36,000 lb 10.60; 36,000 lb and over 10.35.

Nickel Chloride: 100 lb 45.00; 200 lb 43.00; 300 lb 42.00; 400-4900 lb 40.00; 5000-9900 lb 38.00; 10,000 lb and over 37.00.

Nickel Sulphate: 100 lb 37.00; 200 lb 35.00; 300 lb 34.00; 400-4900 lb 32.00; 5000-35,000 lb 30.00; 36,000 lb and over 29.00.

Silver Cyanide: Cents per ounce, 16 oz 80.625; 100 oz 78.50; 25,000 oz and over 77.325.

Sodium Cyanide: Egg, under 1000 lb 19.80; 1000-19,900 lb 18.80; 20,000 lb and over 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb 71; 100-600 lb 56.7; 700-1900 lb 54.3; 2000-9900 lb 52.5; 10,000 lb or more 51.4.

Stannous Chloride: (Anhydrous): Less than 50 lb $1.57; 50 lb $1.23; 100-300 lb $1.08; 400-900 lb $1.055; 100-1900 lb $1.031; 2000-4900 lb 99.4; 5000-19,000 lb 99.3; 20,000 lb and over 87.2.

Stannous Sulphate: Less than 5 lb $1.269; 50 lb 96.9; 100-1900 lb 94.9; 2000 lb and over 92.9.

Zinc Cyanide: Under 1000 lb 54.30, 1000 lb and over 52.30.

Command performance

by Chandler

You have a right to expect "command performance" from every fastener you buy today. Modern automotive engines and aircraft power plants are being put to greater tests. Farm equipment is being designed to accomplish more at greater economies.

It is natural that you expect suppliers to produce finer and higher quality fasteners to meet these increased demands.

That is why CHANDLER specialists are working harder than ever to supply cap screws to closer tolerances to meet your new requirements. Chandler is producing the finest fasteners today in all of its 25 years of experience. Chandler is specializing in mass production of bolts from high alloy steels . . . with special heads or threads . . . with drilled heads or shanks . . . ground to close tolerances . . . and with threads rolled after heat treating.

There is a Chandler cold wrought metal fastener to meet your specifications. It is a fastener of highest quality, uniform accuracy . . . to meet industry's *"command performance"*.

Write today for Bulletin 1264-CH

1488 CHARDON ROAD
CLEVELAND 17, OHIO

1695-CH

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on page 175. Key to footnotes, page 177.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$61.50

INGOTS, Alloy (NT)
Detroit R7 .....$65.00
Houston S5 .....73.00
Midland,Pa. C18 .....65.00
Munhall,Pa. U5 .....65.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Aliquippa,Pa. J5 .....$64.00
Bessemer,Pa. U5 .....64.00
Buffalo R2 .....64.00
Clairton,Pa. U5 .....64.00
Ensley,Ala. T2 .....64.00
Fairfield,Ala. T2 .....64.00
Fontana,Calif. K1 .....72.00
Gary,Ind. U5 .....64.00
Johnstown,Pa. B2 .....64.00
Lackawanna,N.Y. B2 ..64.00
Munhall,Pa. U5 .....64.00
So.Chicago,Ill. R2,U5 ..64.00
So.Duquesne,Pa. U5 ...64.00
Youngstown R2 .....64.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 .....$78.00
Bessemer,Pa. U5 .....78.00
Buffalo R2 .....78.00
Canton,O. R2 .....80.00
Clairton,Pa. U5 .....78.00
Conshohocken,Pa. A3 ..83.00
Ensley,Ala. T2 .....78.00
Fairfield,Ala. T2 .....78.00
Fontana,Calif. K1 .....86.00
Gary,Ind. U5 .....78.00
Geneva,Utah C11 .....78.00
Houston S5 .....85.00
Johnstown,Pa. B2 .....78.00
Lackawanna,N.Y. B2 ..78.00
LosAngeles B3 .....87.50
Munhall,Pa. U5 .....78.00
Seattle B3 .....91.50
So.Chicago R2,U5,W14. 78.00
So.Duquesne,Pa. U5 ...78.00
So.SanFrancisco B3 ...87.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ....$86.00
Buffalo R2 .....86.00
Canton,O. R2, T7 .....86.00
Conshohocken,Pa. A3 ..93.00
Detroit R7 .....86.00
Fontana,Calif. K1 ....105.00
Gary,Ind. U5 .....86.00
Houston S5 .....93.00
Ind.Harbor,Ind. Y1 ...86.00
Johnstown,Pa. B2 .....86.00
Lackawanna,N.Y. B2 ..86.00
LosAngeles B3 .....106.00
Massillon,O. R2 .....86.00
Midland,Pa. C18 .....86.00
Munhall,Pa. U5 .....86.00
So.Chicago R2,U5,W14. 86.00
So.Duquesne,Pa. U5 ...86.00
Struthers,O. Y1 .....86.00
Warren,O. C17 .....86.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$96.50
Canton,O. R2 .....96.50
Cleveland R2 .....96.50
Gary,Ind. U5 .....96.50
So.Chicago R2, W14 ..96.50
So.Duquesne,Pa. U5 ...96.50

SKELP
Aliquippa,Pa. J5 .....4.00
Fontana,Calif. K1 .....4.775
Munhall,Pa. U5 .....3.90
Warren,O. R2 .....3.90
Youngstown R2, U5 ....3.90

WIRE RODS
AlabamaCity,Ala. R2 ..4.675
Aliquippa,Pa. J5 .....4.675
Alton,Ill. L1 .....4.85
Buffalo B11, W12 ....4.675
Cleveland A7 .....4.675
Donora,Pa. A7 .....4.675
Fairfield,Ala. T2 .....4.675
Fontana,Calif. K1 ....5.475
Houston S5 .....5.075
IndianaHarbor,Ind. Y1.4.675
Johnstown,Pa. B2 .....4.675
Joliet,Ill. A7 .....4.675
KansasCity,Mo. S5 ....5.015
Kokomo,Ind. C16 .....4.775
LosAngeles B3 .....5.475
Minnequa,Colo. C10 ...4.925
Monessen,Pa. P7 .....4.675
No.Tonawanda,N.Y.B11 4.675
Pittsburg,Calif. C11 ..5.325
Portsmouth P12 .....4.675
Roebling,N.J. R5 .....4.775
So.Chicago,Ill. R2 .....4.675
Sterling,Ill.(1) N15 ....4.675
Sterling,Ill. N15 .....4.775
Struthers,O. Y1 .....4.675
SparrowsPoint,Md. B2..4.775
Torrance,Calif. C11 ...5.475
Worcester,Mass. A7 ...4.975

STRUCTURALS

Carbon Steel Stand. Shapes
Ala.City,Ala. R2 .....4.25
Aliquippa,Pa. J5 .....4.25
Bessemer,Ala. T2 .....4.25
Bethlehem,Pa. B2 .....4.30
Birmingham C15 .....4.25
Clairton,Pa. U5 .....4.25
Fairfield,Ala. T2 .....4.25
Fontana,Calif. K1 .....4.90
Gary,Ind. U5 .....4.25
Geneva,Utah C11 .....4.25
Houston S5 .....4.65
Ind.Harbor,Ind. I-2 ....4.25
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.85
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....4.95
Minnequa,Colo. C10 ....4.70
Munhall Pa. U5 .....4.25
Niles,Calif. P1 .....4.80
Phoenixville,Pa. P4 ....3.95
Seattle B3 .....5.00
So.Chicago U5, W14....4.25
So.SanFrancisco B3 ....4.90
Torrance,Calif. C11 ....4.95
Weirton,W.Va. W6 .....4.25

Wide Flange
Bethlehem,Pa. B2 .....4.30
Clairton,Pa. U5 .....4.25
Fontana,Calif. K1 .....5.25
Lackawanna,N.Y. B2 ...4.30
Munhall,Pa. U5 .....4.25
Phoenixville,Pa. P4 ....3.95
So.Chicago,Ill. U5 .....4.25

Alloy Stand. Shapes
Clairton,Pa. U5 .....5.20
Fontana,Calif. K1 .....6.60
Gary,Ind. U5 .....5.20
Houston S5 .....5.60
Munhall,Pa. U5 .....5.20
So.Chicago,Ill. U5 .....5.20

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 .....6.40
Bessemer,Ala. T2 .....6.40
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.40
Fairfield,Ala. T2 .....6.40
Fontana,Calif. K1 .....7.05
Gary,Ind. U5 .....6.40
Geneva,Utah C11 .....6.40
Houston S5 .....6.80
Ind.Harbor,Ind. I-2, Y1.6.40
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 .....7.00
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.10
Munhall,Pa. U5 .....6.40
Seattle B3 .....7.15
So.Chicago,Ill. U5, W14.6.40
So.SanFrancisco B3 ....7.05
Struthers,O. Y1 .....6.40

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
Munhall,Pa. U5 .....6.40
So.Chicago,Ill. U5 .....6.40

PILING

BEARING PILES
Munhall,Pa. U5 .....4.25
So.Chicago,Ill. U5 .....4.25

STEEL SHEET PILING
Ind.Harbor,Ind. I-2....5.075
Lackawanna,N.Y. B2 ..5.075
Munhall,Pa. U5 .....5.075
So.Chicago,Ill. U5 ....5.075

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 .....4.225
Aliquippa,Pa. J5 .....4.225
Ashland,Ky.(15) A10 ..4.225
Bessemer,Ala. T2 .....4.225
Buffalo R2 .....4.225
Clairton,Pa. U5 .....4.225
Claymont,Del. C22 ....4.225
Cleveland J5, R2 .....4.225
Coatesville,Pa. L7 .....4.225
Conshohocken,Pa. A3 ..4.225
Ecorse,Mich. G5 .....4.375
Fairfield,Ala. T2 .....4.225
Fontana,Calif.(30) K1..4.875
Gary,Ind. U5 .....4.225
Geneva,Utah C11 .....4.225
GraniteCity,Ill. G4 ....4.425
Harrisburg,Pa. C5 ....3.975
Houston S5 .....4.625
Ind.Harbor,Ind. I-2, Y1.4.225
Johnstown,Pa. B2 .....4.225
Lackawanna,N.Y. B2 ..4.225
LoneStar,Tex. L6 .....4.55
Mansfield,O. E6 .....4.225
Minnequa,Colo. C10 ...5.075
Munhall,Pa. U5 .....4.225
Newport,Ky. N9 .....4.225
Pittsburgh J5 .....4.225
Riverdale,Ill. A1 .....4.225
Seattle B3 .....5.125
Sharon,Pa. S3 .....4.225
So.Chicago,Ill. R2 .....4.225
So.Chicago,Ill. U5,W14.4.225
SparrowsPoint,Md. B2..4.225
Steubenville,O. W10 ...4.225
Warren,O. R2 .....4.225
Weirton,W.Va. W6 ....4.225
Youngstown R2, U5, Y1 4.225

PLATES, Carbon Abras. Resist.
Fontana,Calif. K1 .....6.025
Geneva,Utah C11 .....5.375

PLATES, Wrought Iron
Economy,Pa. B14 .....9.80

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland J5, R2 .....6.45
Conshohocken,Pa. A3 ...6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana,Calif.(30) K1 ..7.15
Gary,Ind. U5 .....6.45
Geneva,Utah C11 .....6.45
Houston S5 .....6.85
Ind.Harbor,Ind. I-2, Y1.6.45
Johnstown,Pa. B2 .....6.45
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.35
Munhall,Pa. U5 .....6.45
Pittsburgh J5 .....6.45
Seattle B3 .....7.35
Sharon,Pa. S3 .....6.45
So.Chicago,Ill. U5, W14.6.45
SparrowsPoint,Md. B2 ..6.45
Youngstown U5, Y1 ....6.45

PLATES, Alloy
Claymont,Del. C22 .....5.80
Coatesville,Pa. L7 .....5.80
Fontana,Calif. K1 .....6.45
Gary,Ind. U5 .....5.80
Houston S5 .....6.20
Johnstown,Pa. B2 .....5.80
Munhall,Pa. U5 .....5.80
Newport,Ky. N9 .....5.80
Seattle B3 .....6.70
Sharon,Pa. S3 .....5.80
So.Chicago,Ill. U5, W14.5.80
SparrowsPoint,Md. B2 ..5.80

FLOOR PLATES
Cleveland J5 .....5.275
Conshohocken,Pa. A3 ..5.275
Harrisburg,Pa. C5 .....5.15
Ind.Harbor,Ind. I-2 ...5.275
Munhall,Pa. U5 .....5.275
So.Chicago,Ill. U5 .....5.275

PLATES, Ingot Iron
Ashland c.l. (15) A10..4.475
Ashland l.c.l. (15) A10.4.975
Cleveland c.l. R2 .....4.825
Warren,O. c.l. R2 .....4.825

BARS

BARS, Hot-Rolled Carbon
Ala.City,Ala. R2 .....4.30
Aliquippa,Pa. J5 .....4.30
Alton,Ill. L1 .....4.50
Atlanta,Ga. A11 .....4.50
Bessemer,Ala. T2 .....4.30
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Canton,O. R2 .....4.40
Clairton,Pa. U5 .....4.30
Cleveland R2 .....4.30
Ecorse,Mich. G5 .....4.45
Emeryville,Calif. J7 ...5.05
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 .....5.00
Gary,Ind. U5 .....4.30
Houston S5 .....4.70
Ind.Harbor,Ind. I-2, Y1.4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Massillon,O. R2 .....4.40
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
N.Tonawanda,N.Y. B11.4.30
Pittsburg,Calif. C11 ...5.00
Pittsburgh J5 .....4.30
Portland,Oreg. O4 .....5.05
Seattle B3, N14, P23....5.05
So.Chicago, R2 U5, W14 4.30
So.Duquesne,Pa. U5 ....4.30
So.SanFran.,Calif. B3 ..5.05
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Warren,O. R2 .....4.30
Weirton,W.Va. W6 .....4.30
Youngstown R2, U5.....4.30

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 .....5.075
Buffalo R2 .....5.075
Canton,O. R2, T7 .....5.075
Clairton,Pa. U5 .....5.075
Detroit R7 .....5.075
Ecorse,Mich. G5 .....5.225
Fontana,Calif. K1 ....6.125
Fairless,Pa. U5 .....5.225
Gary,Ind. U5 .....5.075
Houston S5 .....5.475
Ind.Harbor,Ind. I-2, Y1.5.075
Johnstown,Pa. B2 .....5.075
KansasCity,Mo. S5 ....5.675
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....6.125
Massillon,O. R2 .....5.075
Midland,Pa. C18 .....5.075
So.Chicago R2, U5, W14 5.075
So.Duquesne,Pa. U5 ...5.075
Struthers,O. Y1 .....5.075
Warren,O. C17 .....5.075
Youngstown U5.....5.075

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 .....6.45
Bessemer,Ala. T2 .....6.45
Bethlehem,Pa. B2 .....6.45
Clairton,Pa. U5 .....6.45
Cleveland R2 .....6.45
Ecorse,Mich. G5 .....6.60
Fairfield,Ala. T2 .....6.45
Fontana, Calif. K1 .....7.70
Gary,Ind. U5 .....6.45
Houston S5 .....6.85
Ind.Harb.,Ind. I-2, Y1..6.45
Johnstown,Pa. B2 .....6.45
KansasCity,Mo. S5 .....7.05
Lackawanna,N.Y. B2 ...6.45
LosAngeles B3 .....7.15
Pittsburgh J5 .....6.45
Seattle B3 .....7.20
So.Chicago W14 .....6.45
So.Duquesne,Pa. U5 ...6.45
So.SanFrancisco B3 ....7.20
Struthers,O. Y1 .....6.45
Warren,O. R2 .....6.45
Youngstown U5 .....6.45

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa. B2 .....4.45

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....4.30
Atlanta A11 .....4.50
Fontana,Calif. K1 .....5.00
Niles,Calif. P1 .....4.85
SanFrancisco S7 .....4.70

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 .....5.20
Gary,Ind. U5 .....5.20
Houston S5 .....5.60
KansasCity S5 .....5.80
Youngstown U5 .....5.20

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....5.40
BeaverFalls,Pa. M12, R2 5.40
Camden,N.J. P13 .....5.85
Carnegie,Pa. C12 .....5.40
Chicago W18 .....5.40
Cleveland A7, C20 .....5.40
Detroit R7 .....5.40
Detroit B5, P17 .....5.60
Donora,Pa. A7 .....5.40
Elyria,O. W8 .....5.40
FranklinPark,Ill. N5 ....5.40
Gary,Ind. R2 .....5.40
GreenBay,Wis. F7 .....5.40
Hammond,Ind. L2, M13.5.40
Hartford,Conn. R2 .....5.90
Harvey,Ill. B5 .....5.40
LosAngeles R2 .....6.85
LosAngeles S30 .....6.85
Mansfield,Mass. B5 ....5.95
Massillon,O. R2 R8 ....5.40
Monaca,Pa. S17 .....5.40
Newark,N.J. W18 .....5.85
NewCastle,Pa.(17) B4 ..5.40
Pittsburgh J5 .....5.40
Plymouth,Mich. P5 ....5.65
Putnam,Conn. W18 .....5.95
Readville,Mass. C14 ....5.95
St.Louis,Mo. M5 .....5.70
So.Chicago,Ill. W14 ....5.40
SpringCity,Pa. K3 .....5.85
Struthers,O. Y1 .....5.40
Waukegan,Ill. A7 .....5.40
Worcester,Mass. W19 ...5.85
Youngstown F3, Y1 ....5.40

BARS, Cold-Finished Alloy (Turned and Ground)
Cumberland,Md.(5) C19.4.65

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....6.625
BeaverFalls,Pa. M12, R2 6.625
Bethlehem,Pa. B2 .....6.625
Buffalo B5 .....6.625
Camden,N.J. P13 .....6.80
Canton,O. T7 .....6.625
Carnegie,Pa. C12 .....6.625
Chicago W18 .....6.625
Cleveland A7, C20 .....6.625
Detroit R7 .....6.625
Detroit B5, P17 .....6.825
Donora,Pa. A7 .....6.625
Elyria,O. W8 .....6.625
Gary,Ind. R2 .....6.625
Hammond,Ind. L2, M13 6.625
Hartford,Conn. R2 ....6.925
Harvey,Ill. B5 .....6.625
Lackawanna,N.Y. B2..6.625
LosAngeles S30 .....8.30
Mansfield,Mass. B5 ...6.925
Massillon,O. R2, R8 ...6.625
Midland,Pa. C18 .....6.625
Monaca,Pa. S17 .....6.625
Newark,N.J. W18 .....6.80
Plymouth,Mich. P5 ....6.825
So.Chicago W14 .....6.625
SpringCity,Pa. K3 .....6.80
Struthers,O. Y1 .....6.625
Warren,O. C17 .....6.625
Waukegan,Ill. A7 .....6.625
Worcester,Mass. A7 ...6.925
Youngstown F3, Y1 ...6.625

BARS, Reinforcing (fabricators)
Ala.City,Ala. R2 .....4.30
Atlanta A11 .....4.50
Birmingham C15 .....4.30
Buffalo R2 .....4.30
Cleveland R2 .....4.30
Emeryville,Calif. J7 ....5.05
Fairfield,Ala. T2 .....4.30
Fairless,Pa. U5 .....4.45
Fontana,Calif. K1 .....5.00
Ft.Worth,Tex.(42) T4 ..4.90
Gary,Ind. U5 .....4.30
Houston S5 .....4.70

Ind.Harbor,Ind. I-2, Y1..4.30
Johnstown,Pa. B2 .....4.30
KansasCity,Mo. S5 ....4.90
Lackawanna,N.Y. B2 ...4.30
LosAngeles B3 .....5.00
Milton,Pa. M18 .....4.30
Minnequa,Colo. C10 ....4.75
Niles,Calif. P1 .....4.85
Pittsburg,Calif. C11 ....5.00
Pittsburgh J5 .....4.30
SandSprings,Okla. S5 ..5.15
Seattle B3, N14, P23...5.05
So.Chicago R2 .....4.30
So.Duquesne,Pa. U5 ...4.30
So.SanFrancisco B3 ....5.05
SparrowsPoint,Md. B2 ..4.30
Sterling,Ill.(1) N15 ....4.30
Sterling,Ill. N15 .....4.40
Struthers,O. Y1 .....4.30
Torrance,Calif. C11 ....5.00
Youngstown R2, U5 ....4.30

BARS, Reinforcing (Fabricated; to consumers)

Johnstown,Pa., ¼-1" B2..5.70
KansasCity S5 .....6.50
LosAngeles B3 .....5.95
Marion,O. P11 .....5.55
Seattle B3, N14, P23 ..6.15
So.SanFrancisco B3 ....6.00
SparrowsPt, ¼-1" B2..5.70
Williamsport,Pa. S19 ..5.60

RAIL STEEL BARS

Avis,Pa.(3) J8 .....4.25
ChicagoHts.(3) C2, I-2.4.20
ChicagoHts.(4) C2, I-2.4.30
Ft.Worth,Tex(26) T4 ..4.75
Franklin,Pa. (3) F5 ....4.05
Franklin,Pa. (4) F5 ....4.15
Marion,O.(3) P11 .....4.15
Moline,Ill.(3) R2 .....4.30
Tonawanda(3) B12 ....4.15
Tonawanda(4) B12 ....4.30
Williamsport,Pa.(3) S19.4.30

BARS, Wrought Iron

Economy,Pa.(S.R.) B14 10.85
Economy,Pa.(D.R.) B14 13.50
Economy(Staybolt) B14 13.80
McK.Rks.(S.R.) L5 ..10.85
McK.Rks.(D.R.) L5 ..14.75
McK.Rks.(Staybolt) L5 16.25

SHEETS

SHEETS, Hot-Rolled Steel (18 gage and heavier)

Ala.City,Ala. R2 .....4.05
Allenport,Pa. P7 .....4.05
Ashland,Ky.(8) A10 ....4.05
Cleveland J5, R2 .....4.05
Conshohocken,Pa. A3 ..4.10
Detroit(8) M1 .....4.20
Ecorse,Mich. G5 .....4.20
Fairfield,Ala. T2 .....4.05
Fairless,Pa. U5 .....4.10
Fontana,Calif. K1 ....4.823
Gary,Ind. U5 .....4.05
Geneva,Utah C11 .....4.15
GraniteCity,Ill. G4 ....4.25
Houston S5 .....4.45
Ind.Harbor,Ind. I-2, Y1.4.05
Irvin,Pa. U5 .....4.05
Kokomo,Ind. C16 .....4.15
Lackawanna,N.Y. B2 ..4.05
Mansfield,O. E8 (37) ...4.05
Mansfield,O. E6 (38) ...4.80
Munhall,Pa. U5 .....4.05
Newport,Ky. N9 .....4.05
Niles,O. N12 .....4.05
Pittsburg,Calif. C11 ....4.75
Pittsburgh J5 .....4.05
Portsmouth,O. P12 .....4.05
Riverdale,Ill. A1 .....4.05
Sharon,Pa. S3 .....4.05
So.Chicago,Ill. W14 ....4.05
SparrowsPoint,Md. B2 ..4.05
Steubenville,O. W10 ....4.05
Warren,O. R2 .....4.05
Weirton,W.Va. W6 ....4.05
Youngstown U5, Y1 ....4.05

SHEETS, H.R. (19 ga. lighter)

Ala.City,Ala. R2 .....5.35
Kokomo,Ind. C16 .....5.20
Niles,O. N12 .....4.95

SHEETS, H.R. (14 ga. heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.10
Conshohocken,Pa. A3 ..6.15
Ecorse,Mich. G5 .....6.25
Fairfield,Ala. T2 .....6.10
Fairless,Pa. U5 .....6.15
Fontana,Calif. K1 ....6.875
Gary,Ind. U5 .....6.10
Ind.Harbor,Ind. I-2, Y1.6.10
Irvin,Pa. U5 .....6.10
Lackawanna(35) B2 ....6.10
Munhall,Pa. U5 .....6.10
Pittsburgh J5 .....6.10
Sharon,Pa. S3 .....6.10
So.Chicago,Ill. U5 .....6.10
SparrowsPoint(36) B2 ..6.10
Warren,O. R2 .....6.10
Weirton,W.Va. W6 ....6.10
Youngstown U5, Y1 ....6.10

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ....4.30
Cleveland R2 .....4.65
Ind.Harbor,Ind. I-2 ....4.30
Warren,O. R2 .....4.65

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....4.95
Cleveland J5, R2 .....4.95
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....4.95
Fairless,Pa. U5 .....5.00
Follansbee,W.Va. F4 ...4.95
Fontana,Calif. K1 .....6.05
Gary,Ind. U5 .....4.95
GraniteCity,Ill. G4 .....5.15
Ind.Harbor,Ind. I-2, Y1.4.95
Irvin,Pa. U5 .....4.95
Lackawanna,N.Y. B2 ..4.95
Middletown,O. A10 ....4.95
Pittsburg,Calif. C11 ....5.90
Pittsburgh J5 .....4.95
Portsmouth,O. P12 .....4.95
SparrowsPoint,Md. B2 ..4.95
Steubenville,O. W10 ....4.95
Warren,O. R2 .....4.95
Weirton,W.Va. W6 ....4.95
Youngstown Y1 .....4.95

SHEETS, Cold-Rolled High-Strength Low-Alloy

Cleveland J5, R2 .....7.50
Ecorse,Mich. G5 .....7.65
Fairless,Pa. U5 .....7.55
Fontana,Calif. K1 .....8.55
Gary,Ind. U5 .....7.50
IndianaHarbor,Ind. Y1..7.50
Irvin,Pa. U5 .....7.50
Lackawanna(37) B2 ..7.50
Pittsburgh J5 .....7.50
SparrowsPoint(38) B2 ..7.50
Warren,O. R2 .....7.50
Weirton,W.Va. W6 ....7.50
Youngstown Y1 .....7.50

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....5.55
Middletown,O. A10 ....5.45
Warren,O. R2 .....5.55

SHEETS, Culvert (16 Ga.)

	Cu Alloy	Cu Fe
Ashland,Ky.	A10.6.50	....
Canton,O.	R2 ...6.50	7.10
Fairfield	T2 .....5.70	....
Gary,Ind.	U5 ....5.70	5.95
Ind.Harbor	I-2 ..6.25	6.50
Irvin, Pa.	U5 ...5.70	....
Kokomo,Ind.	C16.6.35	....
MartinsFry.,O.	W10 6.25	....
Newport,Ky.	N9..6.25	6.50
Pitts.,Calif.	C11 ..6.45	....
SparrowsPt.	B2..6.25	....

SHEETS, Culvert Pure Iron

Ashland,Ky. A10 .....6.75
MartinsFerry,O. W10 ...6.50
Gary,Ind. U5 .....5.95

SHEETS, Galvanized Steel Hot-dipped

Ala.City,Ala. R2 .....5.45‡
Ashland,Ky. A10 .....5.45*
Butler,Pa. A10 .....5.45†
Canton,O. R2 .....5.45‡
Dover,O. R1 .....5.45‡
Fairfield,Ala. T2 .....5.45*
Gary,Ind. U5 .....5.45*
GraniteCity,Ill. G4 ....5.65‡
Ind.Harbor,Ind. I-2 ...5.45†
Irvin,Pa. U5 .....5.45†
Kokomo,Ind. C16 .....5.55‡
MartinsFerry,O. W10 ..5.45*
Middletown,O. A10 ....5.45†
Newport,Ky. N9 .....5.45†
Niles,O. N12 .....5.45‡
Pittsburg,Calif. C11 ..6.20‡
SparrowsPt.,Md. B2 ..5.45‡
Steubenville,O. W10 ...5.45‡
Weirton,W.Va. W6 ....5.45*

*Continuous and noncontinuous. †Continuous. ‡ Noncontinuous.

SHEETS, Galvanized High-Strength Low-Alloy

Irvin,Pa. U5 .....8.20
SparrowsPoint(39) B2 ..8.20

SHEETS, Galvannealed Steel

Canton,O. R2 .....5.55
Irvin,Pa. U5 .....5.55
Kokomo,Ind. C16 .....5.95†
Newport,Ky. N9 .....6.00
Niles,O. N12 .....6.00

SHEETS, Galvanized Ingot Iron

Ashland,Ky.(8) A10 ....5.70
Canton,O. R2 .....6.20

SHEETS, Galvanized Ingot Iron (Hot-dipped continuous)

Ashland,Ky. A10 .....5.70
Butler,Pa. A10 .....5.70
Middletown,O. A10 ....5.70

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.30
Niles,O.(28) R2 .....6.30
Weirton,W.Va. W6 ....5.975

SHEETS, Aluminum Coated

Butler,Pa. A10 .....8.625

SHEETS, Enameling Iron

Ashland,Ky.(8) A10 ...5.375
Cleveland R2 .....5.375
Gary,Ind. U5 .....5.375
GraniteCity,Ill. G4 ....5.575
Ind.Harbor,Ind. I-2 ...5.375
Irvin,Pa. U5 .....5.375
Middletown,O. A10 ....5.375
Niles,O. N12 .....5.375
Youngstown Y1 .....5.375

BLUED STOCK, 29 ga.

Follansbee,W.Va. F4 ..7.375
Follansbee(23) F4 .....6.60
Yorkville,O. W10 .....7.375

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 5.85
Gary,Ind. U5 .....5.85
Mansfield,O. E6 .....5.85
Middletown,O. A10 ....5.85
Niles,O. N12 .....5.85
Weirton,W.Va. W6 ....5.85

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....6.25

SHEETS, Well Casing

Fontana,Calif. K1 ....6.325

Key to Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Co.
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div. Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C31 Chester Blast Furnace Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Sons, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div.
N5 Nelsen Steel & Wire Co.
N6 NewEng. HighCarb.Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N12 Niles Rolling Mill Div.
N14 Nrthwst.Steel Roll. Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.

O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P23 Pacific Steel Rolling

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 RelianceDiv.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div. Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless WeldedProducts
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.

T2 Tenn. Coal & Iron Div.
T3 Tenn.Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan.San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Steel Co.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.05
Allenport,Pa. P7	4.05
Alton,Ill. L1	4.225
Ashland,Ky.(8) A10	4.05
Atlanta A11	4.25
Bessemer,Ala. T2	4.05
Birmingham C15	4.05
Bridgeport,Conn.(10)S15	4.05
Buffalo(27) R2	4.05
Conshohocken,Pa. A3	4.175
Detroit M1	4.20
Ecorse,Mich. G5	4.20
Fairfield,Ala. T2	4.05
Fontana,Calif. K1	4.825
Gary,Ind. U5	4.05
Houston,Tex. S5	4.45
Ind.Harbor,Ind. I-2, Y1	4.05
Johnstown,Pa.(25) B2	4.05
KansasCity,Mo.(9) S5	4.65
Lackw'na,N.Y.(25) B2	4.05
LosAngeles(25) B3	4.80
Milton,Pa. M18	4.05
Minnequa,Colo. C19	5.15
NewBritain(10) S15	4.05
N.Tonawanda,N.Y. B11	4.05
Pittsburg,Calif. C11	4.80
Portsmouth,O. P12	4.05
Riverdale,Ill. A1	4.05
SanFrancisco S7	5.00
Seattle(25) B3, P23	5.05
Seattle N14	5.05
Sharon,Pa. S3	4.05
So.Chicago,Ill. W14	4.05
So.SanFrancisco(25) B3	4.80
SparrowsPoint,Md. B2	4.05
Sterling(1) N15	4.05
Sterling,Ill. N15	4.15
Torrance,Calif. C11	4.80
Warren,O. R2	4.05
Weirton,W.Va. W6	4.05
Youngstown U5	4.05

STRIP, Hot-Rolled Alloy

Bridgeport,Conn.(10)S15	6.45
Carnegie,Pa. S18	6.70
Fontana,Calif. K1	8.10
Gary,Ind. U5	6.70
Houston,Tex. S5	7.10
KansasCity,Mo. S5	7.30
LosAngeles B3	7.90
NewBritn.,Conn.(10)S15	6.45
Newport,Ky. N9	6.70
Seattle P23	7.80
Sharon,Pa. S3	6.70
So.Chicago W14	6.70
Youngstown U5	6.70

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.15
Conshohocken,Pa. A3	6.15
Ecorse,Mich. G5	6.30
Fairfield,Ala. T2	6.15
Fontana,Calif. K1	7.25
Gary,Ind. U5	6.15
Houston S5	6.55
Ind.Harbor,Ind. I-2, Y1	6.15
KansasCity,Mo. S5	6.75
Lackawanna,N.Y. B2	6.15
LosAngeles(25) B3	6.90
Seattle(25) B3, P23	7.15
Sharon,Pa. S3	6.15
So.SanFrancisco(25) B3	6.90
SparrowsPoint,Md. B2	6.15
Warren,O. R2	6.15
Weirton,W.Va. W6	6.15
Youngstown U5, Y1	6.15

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.30
Warren,O. R2	4.65

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	5.75
Baltimore T6	5.75
Bridgeport,Conn.(10)S15	5.75
Cleveland A7, J5	5.75
Dearborn,Mich. D3	5.90
Detroit D2, M1	5.90
Detroit P20	5.95
Dover,O. G6	5.75
Ecorse,Mich. G5	5.90
Follansbee,W.Va. F4	5.75
Fontana,Calif. K1	7.65
FranklinPark,Ill. T6	5.85
Ind.Harbor,Ind. I-2	6.00
Indianapolis C8	5.90
Lackawanna,N.Y. B2	5.75
LosAngeles C1	7.80
Mattapan,Mass. T6	6.30
Middletown,O. A10	5.75
NewBedford,Mass. R10	6.20
NewBritain(10) S15	5.75
NewCastle,Pa. B4, E5	5.75
NewHaven,Conn. A7	6.50
NewHaven,Conn. D2	6.20
Pawtucket,R.I. R3	6.40
Pawtucket,R.I. N8	6.30
Pittsburgh J5	5.75
Portsmouth,O. P12	5.75
Riverdale,Ill. A1	5.85
Rome,N.Y.(32) R6	5.75
Sharon,Pa. S3	5.75
SparrowsPt., Md. B2	5.75
Trenton,N.J. R5	7.00
Wall'ford,Conn. W2	6.20
Warren,O. B9, R2, T5	5.75
Weirton,W.Va. W6	5.75
Worcester,Mass. A7	6.60
Youngstown C8, Y1	5.75

STRIP, Cold-Rolled Alloy

Carnegie,Pa. S18	12.45
Cleveland A7	12.45
Dover,O. G6	12.45
Fontana,Calif. K1	14.55
FranklinPark,Ill. T6	12.45
Harrison,N.J. C18	12.45
Mattapan,Mass. T6	12.80
Pawtucket,R.I. N8	12.80
Sharon,Pa. S3	12.45
Worcester,Mass. A7	12.75
Youngstown C8	12.90

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	5.75	8.35	9.30	11.45	14.15
Bridgeport,Conn.(10) S15	5.75	8.05	9.30	11.15	13.85
Bristol,Conn. W1	...	...	9.30	11.45	....
Carnegie,Pa. S18	...	8.05	9.00	11.15	13.85
Cleveland A7	5.75	8.05	9.00	11.15	13.85
Cleveland C7	...	8.05	9.00	11.15	13.85
Dearborn,Mich. D3	5.90	8.25	9.20	....	....
Detroit D2	5.90	8.25	9.20	10.95	....
Dover,O. G6	5.85	8.05	9.00	11.15	13.85
FranklinPark,Ill. T6	5.85	8.05	9.00	11.15	13.85
Harrison,N.J. C18	...	...	9.30	11.45	14.15
Indianapolis C8	6.00	8.20	9.00	11.15	13.85
Mattapan,Mass. T6	6.30	8.35	9.30	11.45	14.15
NewBritn.,Conn.(10) S15	5.75	8.05	9.00	11.15	13.85
NewCastle,Pa. B4	5.75	8.05	9.00	11.15	....
NewCastle,Pa. E5	5.75	8.05	9.00	11.15	13.85
NewHaven,Conn. D2	6.20	8.35	9.30	11.25	....
NewYork W3	...	8.35	9.30	11.45	14.15
Pawtucket,R.I. N8	6.30	8.35	9.30	11.45	14.15
Riverdale,Ill.(1) A1	5.85	8.05	9.00	11.15	13.85
Rome,N.Y.(32) R6	5.75	8.05	9.00	10.95	13.25
Sharon,Pa. S3	5.75	8.05	9.00	11.15	13.85
Trenton,N.J. R5	...	8.35	9.30	11.45	14.15
Wallingford,Conn. W2	6.20	8.35	9.30	11.45	14.15
Warren,O. T5	5.75	8.05	9.00	10.95	13.25
Weirton,W.Va. W6	5.75	8.05	9.00	11.15	13.85
Worcester,Mass. A7, T6	6.60	8.35	9.30	11.45	14.15
Youngstown C8	5.85	8.05	9.00	11.15	13.85
Spring Steel (Tempered)					
Bristol,Conn. W1	...	...	12.90	15.60	....
Buffalo W12	...	...	12.90	....	....
Harrison,N.J. C18	...	...	12.90	15.60	19.00
NewYork W3	...	...	12.90	15.60	19.00
Trenton,N.J. R5	...	...	12.90	15.60	19.00
Worcester,Mass. T6	...	...	12.90	15.60	19.00
Worcester,Mass. W12	...	...	12.90	....	....
Youngstown C8	...	...	13.25	15.95	19.35

STRIP, Cold-Rolled High-Strength Low-Alloy

Cleveland A7, J5	8.60
Dearborn,Mich. D3	8.75
Dover,O. G6	8.60
Ecorse,Mich. G5	8.75
Lackawanna,N.Y. B2	8.425
Pittsburgh J5	8.60
Sharon,Pa. S3	8.60
SparrowsPoint,Md. B2	8.425
Warren,O. R2	8.60
Weirton,W.Va. W6	8.60
Youngstown Y1	8.60

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	6.35

STRIP, Electrogalvanized

Dover,O. G6	5.75
Youngstown C8	5.75

TIGHT COOPERAGE HOOP

Atlanta A11	4.775
Riverdale,Ill. A1	4.625
Sharon,Pa. S3	4.475
Youngstown U5	4.475

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Meter	Dynamo
BeechBottom,W.Va. W10	....	...	9.10	10.10	11.00
Brackenridge,Pa. A4	....	...	9.10	10.10	11.00
IndianaHarbor,Ind. I-2	8.025	8.50	9.10	10.10	....
Mansfield,O. E6	8.025	8.50	9.10	10.10	11.00
Newport,Ky. N9	8.025	8.50	9.10	10.10	11.00
Niles,O. N12	8.025	8.50	9.10	10.10	....
Vandergrift,Pa. U5	....	8.50	9.10	10.10	11.00
Warren,O. R2	8.025	8.50	9.10	10.10	11.00
Zanesville,O. A10	....	8.50	9.10	10.10	11.00

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Meter	Dynamo
Brackenridge,Pa. A4	....	...	9.85	10.85	11.75
GraniteCity,Ill. G4	8.425*	8.95*	9.55*	10.55*	....
IndianaHarbor,Ind. I-2	8.225	8.75*	9.35*	....	....
Vandergrift,Pa. U5	....	9.25†	9.85†	10.85†	11.75†
Vandergrift,Pa. U5	8.225*	8.75*	9.35*	10.35*	11.25*
Warren,O. R2	8.225†	9.25	9.85	10.85	11.75
Zanesville,O. A10	....	9.25	9.85	10.85	11.75

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	11.95	12.50	13.00	14.00
Brackenridge,Pa. A4	11.95	....	....	....
Newport,Ky. N9	11.95	....	....	....
Vandergrift,Pa. U5	11.95	12.50	13.00	14.00
Zanesville,O. A10	11.95‡	12.50‡	13.00‡	14.00‡

C.R. COILS & CUT LENGTHS	T-100	T-90	T-80	T-73	T-72
Butler,Pa. A10	....	....	16.60	17.10	....
Vandergrift,Pa. U5	14.00	15.00	16.60	17.10	12.70
Warren,O. R2	....	....	....	....	12.70‡

* Semiprocessed. † Fully processed only. ‡ Coils annealed; semiprocessed ½c lower. § Coils. ¾-cent higher.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.50	$7.75	$8.15
Fairfield,Ala. T2	7.60	7.85	8.25
Fairless,Pa. U5	7.60	7.85	8.25
Gary,Ind. U5	7.50	7.75	8.15
GraniteCity,Ill. G4	7.60	7.85	8.25
IndianaHarbor,Ind. I-2, Y1	7.50	7.75	8.15
Irvin,Pa. U5	7.50	7.75	8.15
Niles,O. R2	7.50	7.75	8.15
Pittsburg,Calif. C11	8.25	8.50	8.90
SparrowsPoint,Md. B2	7.60	7.85	8.25
Weirton,W.Va. W6	7.50	7.75	8.15
Yorkville,O. W10	7.50	7.75	8.15
ELECTROTIN (22-27 Gage; Dollars per 100 lb)			
Aliquippa,Pa. J5	6.175	....	....
Niles,O. R2	6.175	6.375	6.575

TIN PLATE, American Coke (Base Box)	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$8.80	$9.05
Fairfield,Ala. T2	8.90	9.15
Fairless,Pa. U5	8.90	9.15
Gary,Ind. U5	8.80	9.05
Ind.Har. I-2, Y1	8.80	9.05
Irvin,Pa. U5	8.80	9.05
Pitts.,Cal. C11	9.55	9.80
Sp.Pt.,Md. B2	8.90	9.15
Warren,O. R2	8.80	9.05
Weirton,W.Va. W6	8.80	9.05
Yorkville,O. W10	8.80	9.05

BLACK PLATE (Base Box)	
Aliquippa,Pa. J5	$6.60
Fairfield Ala. T2	6.70
Fairless,Pa. U5	6.70
Gary,Ind. U5	6.60
GraniteCity,Ill. G4	6.70
Ind.Harbor,Ind. I-2, Y1	6.60
Irvin,Pa. U5	6.60
Niles,O. R2	6.60
Pittsburg,Calif. C11	7.35
Warren,O. R2	6.60
SparrowsPoint,Md. B2	6.70

Weirton,W.Va. W6	6.60
Yorkville,O. W10	6.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Follansbee,W.Va. F4	6.20
Gary,Ind. U5	6.20
GraniteCity,Ill. G4	6.30
Ind.Harbor,Ind. Y1	6.20
Irvin,Pa. U5	6.20
Yorkville,O. W10	6.20

MANUFACTURING TERNES (Special Coated; Base Box)

Gary,Ind. U5	$7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$8.75

ROOFING SHORT TERNES (8 lb Coated)

Gary,Ind. U5	9.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	5.75
Aliquippa,Pa. J5	5.75
Alton,Ill. L1	5.925
Atlanta A11	5.95
Bartonville,Ill. K4	5.85
Buffalo W12	5.75
Chicago W13	5.75
Cleveland A7, C20	5.75
Crawfordsville,Ind. M8	5.85
Donora,Pa. A7	5.75
Duluth Minn. A7	5.75
Fairfield,Ala. T2	5.75
Fostoria,O.(24) S1	5.95
Houston S5	6.15
Jacksonville,Fla. M8	6.27
Joliet,Ill. A7	5.75
KansasCity,Mo. S5	6.35
Kokomo,Ind. C16	5.85
LosAngeles B3	6.70
Minnequa,Colo. C10	6.00
Monessen,Pa. P7	5.75
Newark 6-8 ga. I-1	6.40
No.Tonawanda B11	5.75
Palmer,Mass. W12	6.05
Pittsburg,Calif. C11	6.70
Portsmouth,O. P12	5.75
Rankin,Pa. A7	5.75
So.Chicago,Ill. R2	5.75
So.SanFrancisco C10	6.70
SparrowsPoint,Md. B2	5.85
Sterling,Ill.(1) N15	5.75
Sterling,Ill. N15	5.85
Struthers,O. Y1	5.75
Waukegan,Ill. A7	5.75
Worcester,Mass. A7	6.05

WIRE, M3 Spring, High Carbon

Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.375
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Cleveland A7	7.20
Donora,Pa. A7	7.20
Duluth,Minn. A7	7.20
Fostoria,O. S1	7.20
Johnstown,Pa. B2	7.20
LosAngeles B3	8.15
Millbury,Mass.(12) N6	7.50
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
Muncie,Ind. I-7	7.40
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Roebling,N.J. R5	7.50
So.Chicago,Ill. R2	7.20
So.SanFran. C10	8.15
SparrowsPt.,Md. B2	7.30
Struthers,O. Y1	7.20
Trenton,N.J. A7	7.50
Waukegan,Ill. A7	7.20
Worcester A7,J4,T6,W12	7.50

WIRE, Upholstery Spring

Aliquippa,Pa. J5	6.90
Alton,Ill. L1	7.075
Buffalo W12	6.90
Cleveland A7	6.90
Donora,Pa. A7	6.90
Duluth,Minn. A7	6.90
Johnstown,Pa. B2	6.90
KansasCity,Mo. S5	7.50
LosAngeles B3	7.85
Minnequa,Colo. C10	7.075
Monessen,Pa. P7, P16	6.90
NewHaven,Conn. A7	7.20
Palmer,Mass. W12	7.20
Pittsburg,Calif. C11	7.85
Portsmouth,O. P12	6.90
Roebling,N.J. R5	7.20
So.Chicago,Ill. R2	6.90
So.SanFrancisco C10	7.85
SparrowsPoint,Md. B2	7.00
Trenton,N.J. A7	7.20
Waukegan,Ill. A7	6.90
Worcester,Mass. A7	7.20

WIRE, Fine & Weaving (8" Coils)

Alton,Ill. L1	11.375
Bartonville,Ill. K4	11.30
Buffalo W12	11.20
Chicago W.3	11.20
Cleveland A7	11.20
Crawfordsville,Ind. M8	11.30
Fostoria,O. S1	11.20
Jacksonville,Fla. M8	11.73
Johnstown,Pa. B2	11.20
Kokomo,Ind. C16	11.20
Minnequa,Colo. C10	10.95
Monessen,Pa. P16	11.20
Muncie,Ind. I-7	11.40
Palmer,Mass. W12	11.50
Roebling,N.J. R5	11.50
So.SanFrancisco C10	11.55
Waukegan,Ill. A7	11.20
Worcester,Mass. A7,T6	11.50

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	9.90
Buffalo W12	9.90
Johnstown,Pa. B2	9.90
Minnequa,Colo. C10	10.025
Monessen,Pa. P16	9.90
Muncie,Ind. I-7	10.10
Portsmouth,O. D2	9.90
Roebling,N.J. R5	10.20
SparrowsPt.,Md. B2	10.00

ROPE WIRE (A)

Alton,Ill. L1	9.45
Bartonville,Ill. K4	9.35
Buffalo W12	9.75
Fostoria,O. S1	9.75
Johnstown,Pa. B2	9.75
Monessen,Pa. P7	9.35
Monessen,Pa. P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Portsmouth,O. P12	9.35
Roebling,N.J. R5	10.05
SparrowsPt. B2	9.85
Struthers,O. Y1	9.75
Worcester J4, T6	6.65

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE

(Continued)

WIRE, Tire Bead

Alton, Ill. L1	12.75
Bartonville, Ill. K1	13.25
Monessen, Pa. P16	13.15
Portsmouth, O. P12	13.15
Roebling, N.J. R5	13.45

WIRE, Cold-Rolled Flat

Anderson, Ind. G6	7.95
Baltimore T6	8.25
Buffalo W12	7.95
Cleveland A7	7.95
Crawfordsville, Ind. M8	8.05
Dover, O. G6	7.95
Fostoria, O. S1	7.95
Kokomo, Ind. C16	8.05
Franklin Park, Ill. T6	8.05
Massillon, O. R8	7.95
Milwaukee C23	8.15
Monessen, Pa. P7, P16	7.95
Pawtucket, R.I. N8	8.25
Rome, N.Y. (32) R6	7.95
Trenton, N.J. R5	8.25
Worcester A7, T6, W12	8.25

WIRE, Merchant Quality

(6 to 8 gage)	An'd Galv.
Ala. City, Ala. R2	6.90 7.30**
Aliquippa J5	6.90 7.425§
Atlanta A11	7.00 7.55
Bartonville (48) K4	7.00 7.55
Buffalo W12	6.90 7.30†
Cleveland A7	6.90
Crawfordsville M8	7.00 7.55
Donora, Pa. A7	6.90 7.30†
Duluth, Minn. A7	6.90 7.30†
Fairfield T2	6.90 7.30†
Houston, Tex. S5	7.30 7.70†
Jacksonville, Fla. M8	7.425 7.95
Johnstown B2 (48)	6.90 7.45*
Joliet, Ill. A7	6.90 7.30†
Kansas City, Mo. S5	7.50 7.90†
Kokomo C16	7.00 7.40†
Los Angeles B3	7.85
Minnequa C10	7.15 7.55**
Monessen P7 (48)	6.90 7.45
Palmer W12	7.20 7.60†
Pitts., Calif. C11	7.85 8.25†
Portsmouth, O. P12	6.90
Rankin A7	6.90 7.30†
So. Chicago R2	6.90 7.30**
S.S. Fran. C10	7.85 8.25**
Spar'wsPt. B2 (48)	7.00 7.55*
Str'g (48) N15	6.90 7.45
Struthers, O. (48) Y1	6.90 7.40‡
Worcester A7	7.20

* Based on 11c zinc; †5c zinc; ‡ Less than 10c zinc; **Subject to zinc equalization extras.

WOVEN FENCE, 9-15½ Ga. Col.

Ala. City, Ala. R2	146**
Ala. City, 17 ga. R2	241**
Ala. City, 18 ga. R2	251**
Aliq'ppa, Pa. 9-14½ ga. J5	149§
Atlanta A11	151
Bartonville, Ill. K4	151
Crawfordsville, Ind. M8	151
Donora, Pa. A7	146†
Duluth, Minn. A7	146†
Fairfield, Ala. T2	146†
Houston, Tex. S5	154†
Johnstown, Pa. (43) B2	149
Joliet, Ill. A7	146†
Kansas City, Mo. S5	158†
Kokomo, Ind. C16	148†
Minnequa, Colo. C10	154**
Monessen, Pa. 9 ga. P17	151
Pittsburg, Calif. C11	169†
Rankin, Pa. A7	146†
So. Chicago, Ill. R2	146**
Sterling, Ill. (1) N15	149

† Based on 5c zinc; * 11c zinc; § 10c zinc; ** Subject to zinc equalization extras.

BALE TIES, Single loop

	Col.
Alabama City, Ala. R2	155
Atlanta A11	157
Bartonville, Ill. K4	157
Crawfordsville, Ind. M8	157
Donora, Pa. A7	155
Duluth, Minn. A7	155
Fairfield, Ala. T2	155
Joliet, Ill. A7	155
Houston S5	163
Kansas City, Mo. S5	167
Kokomo, Ind. C16	157
Minnequa, Colo. C10	160
Pittsburg, Calif. C11	179
So. Chicago, Ill. R2	155
So. San Fran., Calif. C10	179
Sparrows Point, Md. B2	157
Sterling, Ill. (1) N15	155

WIRE, Barbed

	Col.
Alabama City, Ala. R2	159**
Aliquippa J5	156§
Atlanta A11	164
Bartonville, Ill. K4	164
Crawfordsville, Ind. M8	164
Donora, Pa. A7	159†
Duluth, Minn. A7	159†
Fairfield, Ala. T2	159†
Houston, Tex. S5	167†
Johnstown, Pa. B2	162*
Joliet, Ill. A7	159†
Kansas City, Mo. S5	171†
Kokomo, Ind. C16	161†
Minnequa, Colo. C10	165**
Monessen, Pa. P7	163
Pittsburg, Calif. C11	179†
Rankin, Pa. A7	159†
So. San Francisco C10	179**
Sparrows Point, Md. B2	164*
Sterling, Ill. (1) N15	162

† Based on 5c zinc; * 11c zinc; §10c zinc; **Subject to zinc equalization extras.

WIRE (16 gage)

	An'd Galv. Stone Stone
Ala. City R2	13.15 14.70**
Aliquippa J5	12.50 14.30§
Bartonville K4	13.25 15.10
Buffalo W12	13.15
Cleveland A7	13.15
Crawfordsville M8	13.25 15.10
Fostoria, O. S1	13.25 14.80†
Johnstown B2	13.15 15.00*
Kokomo C16	12.60 14.15†
Minnequa C10	13.40 15.10**
Palmer, Mass. W12	13.15 14.70*
Pitts., Calif. C11	13.50 15.05†
So. Chicago R2	13.15 14.70
Sparrows Pt. B2	13.25 15.10*
Sterling (1) N15	13.15 15.00
Waukegan A7	13.15 14.70†
Worcester A7	13.45

* Based on 11c zinc; † 5c zinc; § 10c zinc; ** Subject to zinc equalization extras.

NAILS, Stock

To dealers & mfrs. (7)	Col.
Alabama City, Ala. R2	137
Aliquippa, Pa. J5	137
Atlanta A11	139
Bartonville, Ill. K4	139
Chicago, Ill. W13	137
Cleveland A9	142
Crawfordsville, Ind. M8	139
Donora, Pa. A7	137
Duluth, Minn. A7	137
Fairfield, Ala. T2	137
Galveston, Tex. D7	139
Houston, Tex. S5	145
Johnstown, Pa. B2	137
Joliet, Ill. A7	137
Kansas City, Mo. S5	149
Kokomo, Ind. C16	139
Minnequa, Colo. C10	142
Monessen, Pa. P7	137
Pittsburg, Calif. C11	156
Rankin, Pa. A7	137
So. Chicago, Ill. R2	137
Sparrows Pt., Md. B2	139
Sterling, Ill. (1) N15	137
Worcester, Mass. A7	143

NAILS, CUT (100 lb keg)

To dealers (22)	
Conshohocken, Pa. A3	$8.30
Wheeling, W.Va. W10	8.30

STAPLES, Polished Stock

To dealers & mfrs. (7)	Col.
Aliquippa, Pa. J5	138
Atlanta A11	140
Bartonville, Ill. K4	140
Crawfordsville, Ind. M8	140
Donora, Pa. A7	138
Duluth, Minn. A7	138
Fairfield, Ala. T2	138
Johnstown, Pa. B2	138
Joliet, Ill. A7	138
Kokomo, Ind. C16	140
Minnequa, Colo. C10	143
Monessen, Pa. P7	138
Pittsburg, Calif. C11	157
Rankin, Pa. A7	138
Sparrows Pt., Md. B2	140
Sterling, Ill. (1) N15	138
Worcester, Mass. A7	144

FENCE POSTS

	Col.
Chicago Hts., Ill. C2, I-2	150
Duluth, Minn. A7	150
Franklin, Pa. F5	150
Johnstown, Pa. B2	145
Marrion, O. P11	145
Minnequa, Colo. C10	155
Moline, Ill. R2	155
So. Chicago, Ill. R2	150
Tonawanda, N.Y. B12	150
Williamsport, Pa. S19	150

BOLT, NUTS

CARRIAGE, MACHINE BOLTS

(Base discounts, per cent off list, f.o.b. midwestern plants).

1 in. and shorter:	
½-in. & smaller diam.	2
Over 4 in. through 6 in.:	
½ in. & smaller diam	+3
6 in. and shorter:	
⅝-in. and ⅝-in.	+4
¾ in. and larger	+6
Longer than 6 in.:	
All diameters	+15
Lag bolts, all diams.:	
6 in. and shorter	6
Over 6 in. long	+2
Ribbed Necked Carriage	+4
Blank	10
Plow	23
Step, Elevator, Tap and Sleigh Shoes	10
Tire Bolts	+3
Boiler & Fitting-Up Bolts	21

NUTS

H.P. and C.P., regular & heavy:	
Square, all sizes	55
H.P., Hex, regular & heavy:	
⅝" and smaller	55
⅞" to 1⅛", inclusive	58
1¼" to 1½", inclusive	60
1⅝" and larger	55
C.P. Hex regular & heavy:	
All sizes	55
Hot Galv. Nuts (all types):	
⅝" or smaller	38
⅞" to 1⅛", inclusive	41
Finished Hex Nuts:	
New standard, all sizes	55
Semifinished & Slotted Hex:	
Regular and heavy, all sizes	55

SQ'JARE HEAD SET SCREWS

(1035 steel; packaged; per cent off list)

1 in. diam. x 6 in. and shorter	34
1 in. and smaller diam. x over 6 in.	20

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller	31
¼ in. diam. & larger	14
N.F. thread, all diams.	8

STEEL STOVE BOLTS

(F.o.b. plant, per cent off list in packages)

Plain finish	47.5—10
Plated finishes	30—10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:	
¼-in. through ⅝-in.	38
⅝-in. through 1 in.	15
Longer than 6 in.:	
¼-in. through ⅝-in.	20
⅝-in. through 1 in.	7

RIVETS

F.o.b. Cleveland, and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.25
⅞-in. under..List less 37%

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers ..... List

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	19.09	19.00
1¼	13	....	23.21	18.77
1½	13	21.40	25.65	20.75
1⅝	13	25.28	30.31	21.52
2	13	28.33	33.97	27.48
2¼	13	31.91	38.26	30.95
2½	12	34.63	41.52	33.39
2½	12	38.15	45.74	37.00
2⅝	12	41.31	49.53	40.07
3	12	44.05	52.82	42.72

RAILWAY MATERIALS

RAILS	Std. No. 1	Std. No. 2	Std. Tee Rails All No. 2	Std. Tee Rails 60 lb Under
Bessemer, Pa. U5	4.45	4.35	4.40	5.35
Ensley, Ala. T2	4.45	4.35	....	5.35
Fairfield, Ala. T2	....	....	....	5.35
Gary, Ind. U5	4.45	4.35	4.40	....
Huntington, W.Va. W7	....	....	....	5.35
Ind. and Harbor, Ind. I-2	4.45	4.35	4.40	....
Johnstown, Pa. B2	....	....		(16) 5.35
Lackawanna, N.Y. B2	4.45	4.35	....	5.35
Minnequa, Colo. C10	4.45	4.35	....	5.85
Steelton, Pa. B2	4.45	4.35	....	5.35
Williamsport, Pa. S19	....	....	....	5.35

TIE PLATES

Fairfield, Ala. T2	5.275
Gary, Ind. U5	5.275
Ind. Harbor, Ind. I-2	5.275
Lackawanna, N.Y. B2	5.275
Minnequa, Colo. C10	5.275
Seattle B3	5.425
Steelton, Pa. B2	5.275
Torrance, Calif. C11	5.425

TRACK BOLTS (20) Treated

Cleveland R2	11.50
Kansas City, Mo. S5	11.50
Lebanon, Pa. B2	11.50
Minnequa, Colo. C10	11.50
Pittsburgh O3, P14	11.50
Seattle, Wash. B3	12.00

AXLES

Ind. Harbor, Ind. 813	6.75
Johnstown, Pa. B2	6.75

JOINT BARS

Bessemer, Pa. U5	5.425
Fairfield, Ala. T2	5.425
Ind. Harbor, Ind. I-2	5.425
Joliet, Ill. U5	5.425
Lackawanna, N.Y. B2	5.425
Minnequa, Colo. C10	5.425
Steelton, Pa. B2	5.425

SCREW SPIKES

Cleveland R2	11.00

STANDARD TRACK SPIKES

Fairfield, Ala. T2	7.30
Ind. Harbor, Ind. I-2, Y1	7.30
Kansas City, Mo. S5	7.30
Lebanon, Pa. B2	7.30
Minnequa, Colo. C10	7.30
Pittsburgh J5	7.30
Seattle B3	7.80
So. Chicago, Ill. R2	7.30
Struthers O. Y1	7.30
Youngstown R2	7.30

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted)

	Cents
Sponge iron: 98+% Fe, annealed	15.25
Unannealed:	
Minus 100 mesh	11.75
Minus 35 mesh	9.25
Minus 20 mesh	9.00
Swedish, c.l.f. N.Y., c.l., in bags	11.25
Domestic (Swedish), f.o.b. Riverton, N. J., in bags	9.50
Electrolytic iron:	
Melting stock, 99.91% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe	36.50
Unannealed (99+% Fe)	32.50
Unannealed (99+% Fe) (minus 325 mesh)	52.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl iron: 97.9-99.8% size 5 to 10 microns	83.00-148.00
Aluminum: Atomized, 500 lb drums, frgt. allowed:	
Carlots	30.00
Ton lots	32.00
Antimony, 500 lb lots	32.00*
Brass, ⅛-ton lots	29.75-37.75†
Bronze, ⅛-ton lots	31.00-39.00†
Copper:	
Electrolytic	13.75*
Reduced	13.75*
Lead	7.50*
Manganese:	
Minus 35 mesh	61.00
Minus 100 mesh	67.00
Minus 200 mesh	72.00
Nickel, unannealed	89.50
Nickel-Silver, ⅛-ton lots	44.25‡
Nickel-Silver, ⅛-ton lots	47.00**
Phosphor-Bronze, ⅛-ton lots	58.50
Silicon	43.50
Solder	7.00*
Stainless Steel, 302	91.00
Tin	14.50*
Zinc, ⅛-ton lots	17.25-31.00†
Tungsten Melting grade, 99% 60 to 200 mesh:	Dollars
1000 lb and over	4.95
Less than 1000 lb	5.10
Chromium electrolytic 99.2% Cr min.	3.50

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni; **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flat, lands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛" to 1 7/16"; 1 7/16" to 1 15/16" 4.75c; 1 15/16" to 7 5/16" 5.15c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass. base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) 0.25 off for untreated.
(21) New Haven, Conn., base.
(22) Del. San Francisco Bay area.
(23) 20 Ga. 36" wide.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing mill lengths, to fabricators; to consumers, 4.85c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c for carbon and 0.35c H.S.-L.A.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 gage & heavier; 60" & narrower.
(38) 14 gage & lighter.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9 10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. to mill zone or within switching limits, 5.10c.
(43) 9 14½ gage.
(48) 6-7 gage.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Ambridge, Pa. N2	13.5	...	17.5	...	20	...	21.5	...	21.5	...	20.75	...	23.25	...
Lorain, O. N3	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5
Youngstown Y1	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	13.5	+3	17.5	+0.25	20	2.25	21.5	3.75	21.5	3.75	20.75	3	23.25	5.5

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5 (*)	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Alton, Ill. L1	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Benwood, W. Va. W10	24	+4.5	15.25	+10.25	7.25	+17.25	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Butler, Pa. F6	25	+3.5	17	+8.5	9.5	+15	....	..	....	...	....	..	....	....
Etna, Pa. N2	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Fairless, Pa. N3	...	...	....	....	....	....	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Fontana, Calif. K1	...	...	....	....	....	....	10.75	+6.5	13.75	+2.5	16.25	1	18.75	2.25
Ind. Harbor Y1	...	...	....	....	....	....	22.75	5.5	25.75	9.5	28.25	13	30.75	14.25
Lorain, O. N3	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sharon, Pa. S4	25	+3.5	17	+8.5	9.5	+15	....	..	....	...	....	..	....	....
Sharon, Pa. M6	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Sparrows Pt., Md. B2	23	+5.5	15	+10.5	7.5	+17	21.75	4.5	24.75	8.5	27.25	12	29.75	13.25
Youngstown R2, Y1	...	...	....	....	....	....	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25
Wheatland, Pa. W9	23	+5.5	15	+10.5	7.5	+17	23.75	6.5	26.75	10.5	29.25	14	31.75	15.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Alton, Ill. L1	30.25	14.25	30.75	14.75	32.25	15	32.25	15	....	...	....	...
Benwood, W. Va. W10	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Etna, Pa. N2	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Fairless, Pa. N3	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Fontana, Calif. K1	19.25	3.25	19.75	3.75	21.25	4	21.25	4	12.5	+5.25	12.5	+5.25
Ind. Harbor, Ind. Y1	31.25	15.25	31.75	15.75	33.25	16	33.25	16	24.5	6.75	25.5	6.75
Lorain, O. N3	32.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sharon, Pa. M6	13.25	16.25	32.75	16.75	34.25	17	34.25	17	....	...	....	...
Sparrows Pt., Md. B2	30.25	14.25	30.75	14.75	32.25	15	32.25	15	23.5	5.75	23.5	5.75
Youngstown R2, Y1	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75
Wheatland, Pa. W9	32.25	16.25	32.75	16.75	34.25	17	34.25	17	25.5	7.75	25.5	7.75

Galvanized pipe discounts based on current price of zinc (11.50c, East St. Louis).

Stainless Steel

(Representative prices, cents per pound; subject to current lists of extras)

AISI Type	Rerolling Ingots	Rerolling Slabs, Billets	Forging Billets	Seamless Tube Billets	H.R. Strip	Shapes; H.R. & C.F. Bars; Wire	Plates	Sheets	C.R. Strip; Flat Wire
301	16.25	20.50	29.50	34.25	29.75	35.25	37.25	41.25	38.25
302	17.25	22.75	29.75	34.50	32.00	35.50	37.50	41.50	41.50
302B	18.50	24.50	30.50	34.50	35.00	35.50	37.50	44.75	44.75
303	18.75	24.75	32.25	37.25	36.75	38.25	39.75	48.75	45.50
304	18.25	23.75	31.00	36.00	34.25	37.25	39.75	43.75	43.75
304L	....	....	36.00	41.25	39.50	42.50	45.00	48.75	48.75
306	19.50	25.50	....	36.25	37.00	37.50	42.00	51.75	46.75
308	19.75	26.25	35.25	40.75	38.00	42.00	46.00	48.00	48.00
309	26.50	34.75	42.75	49.25	49.25	50.50	53.75	62.00	62.00
309S	28.50	37.50	46.75	54.50	54.00	55.50	59.00	68.50	68.50
310	33.00	43.25	56.75	68.25	62.75	67.50	69.00	72.25	72.25
314	....	....	....	....	....	....	69.00	74.50	....
316	28.00	36.25	46.50	54.50	53.25	55.50	58.75	62.75	62.75
316L	....	....	51.75	59.75	58.25	60.75	64.00	67.75	67.75
317	33.00	43.50	57.25	66.75	67.50	68.25	70.75	77.00	77.00
318	33.50	44.00	55.25	64.50	66.25	65.50	68.75	80.25	80.25
321	22.75	29.50	35.25	40.75	41.00	42.00	45.75	50.50	50.50
330	....	....	....	58.00	....	....	68.50	70.00	73.75	77.75
347	24.50	32.25	39.50	45.75	46.50	46.75	51.25	59.25	59.25
348	....	....	....	48.25	....	....	57.50	62.25	70.50	70.50
403	....	....	....	27.00	30.75	....	32.00	34.25	44.00	41.25
405	16.50	21.75	25.25	29.25	30.50	30.25	31.75	39.75	39.75
410	14.00	18.25	24.00	27.75	26.25	28.75	30.00	34.25	34.25
416	....	....	....	24.50	28.25	....	29.25	30.50	41.25	41.25
420	22.00	28.50	29.25	34.00	35.50	35.00	38.50	52.75	52.75
430	14.25	18.50	24.50	28.25	27.00	29.25	30.50	34.75	34.75
430F	....	18.75	25.00	28.75	....	29.75	31.00	44.00	44.00
431	14.50	18.75	24.50	28.25	27.50	29.25	30.50	35.25	35.25
440A,B,C	....	28.50	29.25	34.00	....	35.00	38.50	49.25	52.75
442	....	....	....	28.00	....	....	30.50	35.25	48.25	47.75
446	....	....	....	33.50	38.25	50.25	39.50	40.75	59.75	59.75
501	....	....	....	14.00	14.50	21.25	16.00	18.25	29.00	29.00
502	....	....	....	15.25	16.00	22.25	17.00	20.00	30.00	30.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Cladding Stainless	Plates: Carbon Base 10%	Plates: Carbon Base 20%	Sheets Carbon Base 20%
302	....	31.00	31.00
304	27.60–28.10	32.50–33.20	32.50
310	36.50	41.00	....
316	32.60–33.10	37.70–42.75	42.75
318	37.00–37.50	42.20–42.70	....
321	29.36–29.80	34.40–37.00	37.00
347	30.40–30.90	35.50–40.50	40.50
405	23.40–23.90	30.60–31.10	....
410	22.90–23.40	30.10–30.60	....
430	23.40	30.60	....
Inconel	46.90	61.90	....
Nickel	38.30	51.70	....
Monel	39.70	52.66	....
Copper*	....	....	46.00

	Strip, Carbon Base: Cold-Rolled 10%	Cold-Rolled Both Sides	Hot-Rolled 10%	Hot-Rolled Both Sides
Copper*	28.85	35.85	25.00	32.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.26	5% Cr Hot Work	0.405
Extra Carbon	0.31-.315	W-Cr Hot Work	0.425
Special Carbon	0.37	V-Cr Hot Work	0.445
Oil Hardening	0.405	Hi-Carbon-Cr	0.73

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.030
18.25	4.25	1	4.75	...	2.245-2.415
18	4	2	9	...	2.615
18	4	2	....	...	1.705
18	4	1	....	...	1.540
14	4	2	5	...	2.185
13.75	3.75	2	5	...	2.185
13.5	4	3	....	...	1.805
9	3.5	..	....	...	1.115
6	4	2	....	5	1.645
6	4	3	....	6	1.290
1.5	4	1	....	8.5	0.900

Tool steel producers include: A4, A8, B2, B8, C4, C9 C13, C18, D4, F2, J3, L3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malleable	Bessemer
Birmingham District				
Birmingham R2	52.38	52.88	....	....
Birmingham U5	....	52.88	56.50†	....
Gadsden, Ala. R2	52.38	52.88	....	....
Woodward, Ala. W15	52.38	52.88	56.50†	....
Cincinnati, del.	....	60.62	....	....
Buffalo District				
Buffalo R2	56.00	56.50	57.00	57.50
Buffalo H1	56.00	56.50	57.00	....
Tonawanda, N.Y. W12	56.00	56.50	57.00	....
No. Tonawanda, N.Y. T9	....	56.50	57.00	57.50
Boston, del.	66.65	67.15	67.65	....
Rochester, N.Y., del.	59.02	59.52	60.02	....
Syracuse, N.Y., del.	60.12	60.62	61.12	....
Chicago District				
Chicago I-3	56.00	56.50	56.50	57.00
Chicago R2	56.00	....	56.50	....
Gary, Ind. U5	56.00	....	56.50	....
Indiana Harbor, Ind. I-2	56.00	....	56.50	....
So. Chicago, Ill. W14, Y1	56.00	56.50	56.50	....
So. Chicago, Ill. U5	56.00	....	56.50	57.00
Milwaukee, del.	58.17	58.67	58.67	59.17
Muskegon, Mich., del.	....	62.80	62.80	....
Cleveland District				
Cleveland A7	56.00	56.50	56.50	57.00
Cleveland R2	56.00	56.50	56.50	....
Akron, O., del. from Cleve.	58.75	59.25	59.25	59.75
Lorain, O. N3	56.00	....	....	57.00
Mid-Atlantic District				
Bethlehem, Pa. B2	58.00	58.50	59.00	59.50
New York, del.	....	62.28	62.78	....
Newark, del.	61.02	61.52	62.02	62.52
Birdsboro, Pa. B10	58.00	58.50	....	....
Chester, Pa. C31	....	48.50	49.00	....
Philadelphia, del.	....	50.16	50.66	....
Steelton, Pa. B2	58.00	58.50	59.00	59.50
Swedeland, Pa. A5	58.00	58.50	59.00	59.50
Philadelphia, del.	59.66	....	....	....
Troy, N.Y. R2	58.00	58.50	59.00	59.50
Pittsburgh District				
Neville Island, Pa. P6	56.00	56.50	56.50	57.00
Pittsburgh (N&S sides), Aliquippa, del.	....	57.87	57.87	58.37
McKees Rocks, del.	....	57.54	57.54	58.04
Lawrenceville, Homestead, Wilmerding, Monaca, del.	....	58.16	58.16	58.66
Verona, Trafford, del.	58.19	58.69	58.69	59.19
Brackenridge, del.	58.45	58.95	58.95	59.45
Bessemer, Pa. U5	56.00	....	56.50	57.00
Clairton, Rankin, So. Duquesne, Pa. U5	56.00	....	....	....
McKeesport, Pa. N3	56.00	....	....	57.00
Midland, Pa. C18	56.00	....	....	....
Monessen, Pa. P7	56.00	....	....	....

	Basic	No. 2 Foundry	Malleable	Bessemer
Youngstown District				
Hubbard, O. Y1	....	....	56.50	....
Sharpsville, Pa. S6	56.00	56.50	56.50	57.00
Youngstown Y1	....	....	56.50	57.00
Youngstown U5	56.00	....	....	57.00
Mansfield, O., del.	60.90	....	61.40	61.90
Duluth I-3	56.00	56.50	56.50	57.00
Erie, Pa. I-3	56.00	56.50	56.50	57.00
Everett, Mass. E1	60.50	61.00	61.50	....
Fontana, Calif. K1	62.00	62.50	....	....
Geneva, Utah C11	56.00	56.50	....	....
Granite City, Ill. G4	57.90	58.40	58.90	....
Ironton, Utah C11	56.00	56.50	....	....
Lone Star, Texas L6	52.00	52.50*	52.50	....
Minnequa, Colo. C10	58.00	59.00	59.00	....
Rockwood, Tenn. T2	....	52.50*	56.50	....
Toledo, O. I-3	56.00	56.50	56.50	57.00
Cincinnati, del.	61.76	62.26	....	....

* Low phos. southern grade. † Phos., 0.30 max.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $3 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.0-6.50% silicon; add $1.00 for each 0.5% Si; 75 cents for each 0.5% Mn over 1%)

Jackson, O. G2, J1	$65.00
Buffalo H1	66.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$80.50
Keokuk, Iowa, Openhearth & Fdry, freight allowed K2	85.00
Keokuk, OH & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	86.00
Wenatchee, Wash. OH & Fdry, freight allowed K2	86.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Cleveland, Intermediate A7	$81.60
Rockwood, Tenn. T3	70.00
Steelton, Pa. B2	64.00
Philadelphia, del.	67.55
Troy, N.Y. R2	64.00

Warehouse Steel Products

Representative prices, cents per pound, subject to extras, f.o.b. warehouse. City delivery charges are 20 cents per 100 lb except Birmingham and St. Paul, 15 cents; New York and Boston, 10 cents; Buffalo, 25 cents on C.R. sheets, galv. sheets, C.F. and alloy bars and 20 cents on other commodities; Philadelphia, 10 cents, except 25 cents on alloy bars; Seattle, Spokane, Wash., no charge.

	SHEETS				STRIP		BARS			Standard Structural Shapes	PLATES	
	Hot Rolled	Cold Rolled	Gal. 10 Ga.†	Stainless Type 302†‡	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.†	H.R. Alloy 4140††‡		Carbon	Floor
Baltimore	6.22	7.51	7.77	....	6.89	...	6.88	8.52§	12.04	6.92	6.57	7.96**
Birmingham	6.35	7.35	8.25‡	....	6.60	...	6.50	9.10	...	6.65	6.85	8.45
Boston	7.23	8.23	9.52	44.78*	7.47	...	7.20	8.60	12.45	7.49	7.37	8.50
Buffalo	6.35	7.40	8.79	....	6.70	...	6.50	7.85	12.15	6.72	6.65	7.90
Carnegie, Pa.	6.38	...	8.30	....	6.72	...	6.51	7.85	12.15	6.72	6.65	6.90
Charlotte, N. C.	6.95	7.80	8.69	....	6.90	...	7.10	8.37	...	7.10	7.10	8.37
Chicago	6.38	7.38	8.30	45.55	6.62	...	6.51	7.50	11.90	6.65	6.52	7.64
Cincinnati	6.49	7.37	8.30	45.80	6.86	...	6.75	7.80	12.15	6.86	6.81	7.89
Cleveland	6.38	7.38	8.45	45.66	6.72	...	6.57	7.60	11.96	7.02	6.69	7.81
Detroit	6.57	7.57	8.58	43.50	6.90	7.36	6.79	7.79	12.10	7.16	6.80	7.83
Erie, Pa.	6.35	7.38	8.30	....	6.70	...	6.50	7.45*	...	6.69	6.52	7.64
Houston	7.35	7.80	9.93	....	7.70	9.30	7.70	9.50	....	7.35	7.35	8.75
Los Angeles	7.40	9.25	9.85	50.15	7.75	11.75	7.35	10.05	13.20	7.55	7.35	9.45
Milwaukee	6.47	7.47	8.39	....	6.71	...	6.60	7.69	11.99	6.86	6.61	7.73
Moline, Ill.	6.73	7.73	8.65	....	6.97	...	6.86	7.85	...	6.81	6.87	...
New York	6.97	7.91	8.79	44.45	7.56	...	7.37	8.73§	12.28	7.38	7.27	8.68
Norfolk, Va.	7.00	...	...	....	7.10	...	7.10	8.60	...	7.10	7.10	7.95
Philadelphia	6.19	7.44	8.26	41.98*	6.96	8.80	6.74	8.36*	11.96	6.54	6.49	7.51**
Pittsburgh	6.38	7.38	8.30	45.50	6.72	...	6.51	7.85	11.90	6.69	6.52	7.64
Portland, Oreg.	7.60	8.75	9.70	48.50	7.85	...	7.55	10.95	14.00	7.50	7.45	9.35
Richmond, Va.	6.43	7.39	8.67	....	6.77	...	6.71	8.33	...	7.08	6.85	8.08
St. Louis	6.67	7.67	8.59	43.89	6.91	...	6.80	7.89	12.19	7.09	6.81	7.93
St. Paul	7.03	8.03	8.96	....	7.28	...	7.16	8.26	...	7.12	7.19	8.30
San Francisco	7.55	8.95	9.35	48.15	7.80	...	7.35	10.05	13.20	7.50	7.40	9.45
Seattle	8.10	9.80	10.15	50.50	8.20	...	7.80	10.95	13.65	7.75	7.80	9.60
Spokane	8.35	9.65†	10.05	....	7.80	...	7.80	10.85§§	14.40	7.45	7.55	9.60
Washington	6.70	7.99	7.97	....	7.37	...	7.38	9.09	....	7.31	7.05	8.16

*Prices do not include gage extras; †prices include gage and coating extras, based on 11-cent zinc except in New York, Philadelphia, Los Angeles, Cincinnati, 11.50-cent zinc) except Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extra; §as rolled; **½-in. and heavier; ††as annealed; ‡‡prices include $2 for crating; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted: Cold-rolled strip and cold-finished bars, 2000 lb and over, except in Seattle, 2000 to 9999 lb; stainless sheets, 5000 lb except in New York and Boston, 10,000 lb; hot-rolled products on West Coast, 2000 to 9999; †—500 to 9999 lb; §—4000 lb and over; ‖—1000 to 1999 lb; ¶—1000 lb and over; ‡—1500 lb to 2999 lb; ‖—f.o.b. local delivery in lots of 10,000 lb and over.

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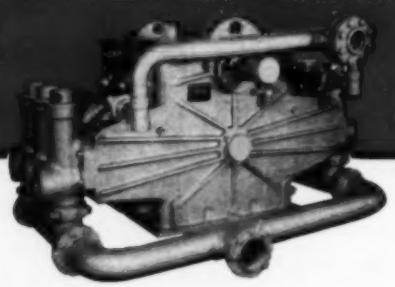
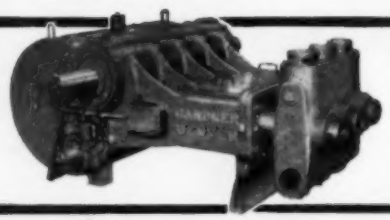
...Hydroblast Cleaning

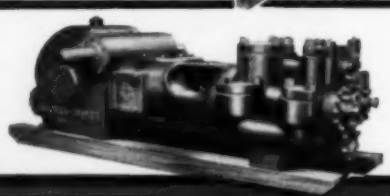
...Hydrostatic Testing



5,000 pounds maximum pressure. Capacity ranges up to 408 gpm. Model PL-7 Six-Cylinder Plunger Pump.



2,600 pounds maximum pressure. Capacity ranges up to 263 gpm. Model PA-8 Triplex Plunger Pump.



1,600 pounds maximum pressure. Capacity ranges up to 264 gpm. Model "FX" Duplex Power Pumps. Models 15 to 100 h.p.

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Gardner-Denver Company, Quincy, Illinois

General Electric Co.

J. H. Carter, generator engineer at General Electric Co., holds a grain oriented silicon steel stator punching in his left hand and a standard punching in his right hand. Note the uniformity of flow in the grain oriented piece

Grain Orientation of Silicon Steel Puts Extra Horsepower on The Production Team

IF YOU aren't acquainted with grain oriented silicon steel, you should be. For it's a comer.

Silicon steel, often called electrical steel because of its uses, has been around for a little over a half century, but it's not dying with age. In fact, it's adding in stature.

As Electricity Goes—Silicon steel forms the core of every electrical generator, transformer and motor. With more and more people doing more and more things electrically, the use of silicon steel is spreading far and wide.

Although it was doing a good job, some people thought it could do even better. The problem has always been: Find a steel to make a magnet that develops maximum power on minimum energy. Possibly the greatest step in this direction brought grain oriented silicon steel in 1937. In it the grain of the steel is oriented, or arranged, so that the flow of magnetic force is concentrated in one direction rather than being allowed to go helter-skelter (see picture above). This contributes to efficiency. It's like having a hundred horses pulling a heavy load. If they all pull together and in the same direction, the load is moved. If they are so improperly harnessed that some of them pull in one direction and some in others, there is less efficiency. Little work gets done.

Top Secret—In orienting the grains in the silicon steel so that the magnetic force will flow in one direction, the secret is in the rolling techniques and heat treatment. To get all of the advantages of the grain oriented silicon, designers of electrical equipment, particularly transformers, had to learn to use the steel in the direction of its best performance. They happily found that the efficiency they gained from the grain oriented material would permit reduction in sizes of transformers. These reductions made it possible to save on other materials going into transformers.

However, all this increase in efficiency in transformer steel did not come over night (see chart).

A new job being given grain oriented silicon steel is in stators of turbine-generators. Stator punchings are cut from the steel so that the grain is oriented in the direction of the flux flow from the field. This reduces core losses about 30 per cent and makes possible a 50-per-cent re-

Less Power Loss = More Efficiency

(Reduction of power losses in transformer steel)

Source: General Electric Co.

duction in the magnetization current of the field. Larger capacity ratings result without increasing the generator frame size, and the generator runs cooler because of the reduced core losses and lower field current. Some of these generators take 120,000 lb of electrical steel.

Joining the TV Set—It's not all large business, however. One place where a bright market is expected for grain oriented silicon steel is in television sets. Only a small amount of such steel is in each set, but there's a market for many sets. With TV makers looking for a way to reduce weight of their sets to cut shipping costs, the grain oriented silicon steel is expected to be a favorite. Its efficiency will allow transformers in TV sets to be reduced 30 per cent in size and weight.

Four steel companies figure prominently in production of grain oriented silicon steel. Allegheny Ludlum Steel Corp. and Armco Steel Corp. make it now. Crucible Steel Co. of America and U. S. Steel Corp. are getting set up to produce it.

Matter of Geography—Allegheny Ludlum makes the product at its West Leechburg, Pa., plant, and Armco makes it at Butler, Pa. Crucible will make it at its Midland, Pa., plant, and U. S. Steel's output will come from Vandergrift, Pa.

Grain oriented silicon steel is distinguished from other silicons by two means: Trade names and type numbers. The latter include T-80 and T-73. The lower the number in the designation, the lower the core loss or the greater the efficiency. Base price of T-73 is 17.1 cents a pound, and base price of T-80 is 16.6 cents. Other grades of silicon steel for other purposes have base prices as low as 8.025 cents lb.

While great efficiency has already been achieved in grain oriented silicon steel, even more efficient grades of it are just around the corner. Its stature can be measured by its tonnage sold last year. Of 820,000 tons of all grades of silicon sheet and strip shipped from mills, around 150,000 tons were grain oriented material.

Refractories . . .

Refractories Prices, Page 185

Rail tariffs on refractory brick and related refractory products in Official territory were reduced an average of 75 cents a net ton on Oct. 8. It's a move by railroads to regain some of the traffic lost to other means of shipping over the last several years. This is the first over-all reduction in the rate for refractories since August, 1953.

Previously, the rate was based on shipments of 60,000 lb subject to a 15-per-cent surcharge. The new rates are based on 70,000 lb, but they are not subject to the surcharge. The new rates do not apply to short hauls with a rate of $2 or less.

For instance, if you were shipping a carload of firebrick from Wallaceton, Pa., to Conneaut, O., on the Bessemer & Lake Erie, the base rate would be $4.78 a ton. The old rate was $4.81 a ton, plus 72 cents surcharge. The net saving is 75 cents a ton. The only catch is the load must now be increased by 5 tons for the new rates to apply.

The reduction follows the trend started with the 15-per-cent reduction on steel products last March. While the railroads did not regain all of the traffic lost to trucks, the results were encouraging enough to prompt the current reduction in a field that has seen a decided swing to other means of transportation.

Interstate Commerce Commission reports that rail carriers in the Illinois Freight Association territory have filed for a similar rate reduction. That would cover shipments from St. Louis to other points in the territory. Indications are that other territories are preparing to ask for the reduction, too.

Plates . . .

Plate Prices, Page 174

Plate business is up slightly but not sufficiently to have a marked bearing on mill operations. Most producers can offer shipments within a week to ten days. Some are operating at less than 50 per cent of capacity.

The low ebb of freight car construction and repair is forcing platemakers to scratch for business. Requirements for construction and pipelines seem likely to continue steady for some time, but there is little prospect for improvement in railroad buying this year, and the outlook for 1955 is dim. Fuel oil storage tank business is up seasonally and shipwork is a little more active.

With competition among plate fabricators unabated, profit margins are narrowing. Most shops are buying plates for prompt delivery in two to three weeks. The bulk of orders is three weeks.

Award of a $160,601,000 combat tank contract to the Newark, Del., plant of the Chrysler Corp. holds promise of substantial buying of high tensile armor plate, steel castings and a variety of other steel products. Actual assembly of the tanks is several months away.

Semifinished Steel . . .

Semifinished Prices, Page 174

Steelmaking operations at Youngstown went up to 62 per cent of capacity last week and will rise to 65 per cent this week. Operations are the highest since early summer.

Youngstown Sheet & Tube Co. started up its Brier Hill works.

At Warren, O., Copperweld Steel Co. boosted output and recalled about 125 men at its electric furnace plant.

U. S. Steel Corp. blew in a fourth blast furnace last week at its Ohio Works.

Operation of No. 1 blast furnace is being resumed at Ironton, Utah, by the Columbia-Geneva Steel Division, U. S. Steel Corp. About 200 workers are being recalled.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 175 & 176

There seems little doubt that the long-predicted fall pickup in sheet demand is here. At any rate, improvement in consumer requirements is gradually being evidenced in quickening steelmaking operations.

The pickup in buying is general at the several market centers, though orders remain in the small category, largely calling for prompt shipments.

Rising cold-rolled sheet order volume from the automotive industry is particularly encouraging. Large-scale auto buying, however, is not thought likely for another two or three weeks.

One sheetmaker, quoting December delivery on cold-rolled, expects to have fourth quarter books filled by mid-October. Demand for hot-rolled strip also is reported rising.

Most sellers of continuous hot-dipped galvanized sheets are booked well into December. One Midwest producer is quoting February shipment.

Construction Faces Bottlenecks

Copper could well turn into a bottleneck for the booming construction industry if the strike situation does not clear up soon. Along with government stockpiling of the red metal, strikes have cut down the supply to below the bare minimum in some cases. One manufacturers' agent in Cleveland says that in some electrical wiring the inventory is practically nonexistent. It is unlikely that the government will release any of its stockpile for fear of being accused of strikebreaking.

Also a potential bottleneck is switchboxes, which this agent says are in short supply just now. There

is no materials problem, but business is so brisk that demand in many cases exceeds the ability to manufacture. He says that business this year is equally as good as 1951, previously regarded as the top year. And the trend is likely to continue into 1955. At present, some switchbox makers are going three shifts a day, six days a week. With inventories having been depleted as long ago as July in some cases, the backlog of orders for switchboxes is on the increase.

Valley Business Looking Up

Youngstown district fabricating plants are experiencing somewhat better business, resulting in the recall of hundreds of furloughed workmen. The improvement is in line with the pickup in local steelmaking operations, currently estimated at 62 per cent of capacity and scheduled to rise to 65 per cent before end of this week.

Structural Shapes . . .

Structural Shape Prices, Page 174

While the current market is devoid of especially large new construction projects, structural steel demand is fairly well sustained over the nation. Reports from leading market centers all point to continued active demand for building steel, though there is some seasonal slackening in contracting with an accompanying increase in competition for going jobs.

Bridgework is outstanding in the East, but there also is a reasonable amount of diversified construction in the area providing substantial tonnage demand. In New England bridge volume is bolstered by fair inquiry for estimates on considerable public and private work, including 2000 tons for a hangar at the Brunswick, Me., naval station.

Construction is maintaining a strong pace in Chicago but structural mills are actively pressing for new business. The reason is the dearth of orders from railroad carbuilders.

Structural steel awards in August fell to the lowest point since April, but shipments continue to run ahead of last year.

August awards totaled 190,498 tons, according to the American Institute of Steel Construction. This compares with the revised figure for July of 258,020 tons, and brings the total tonnage placed in the first eight months of the year to 1,690,060 tons. In the like period of 1953 cumulative awards totaled 2,020,594 tons.

Shipments in August amounted to 268,032 tons, against 247,972 in July and 251,109 in August a year ago. Shipments for the first eight months this year aggregated 2,137,797 tons, against 2,041,883 in 1953.

Order backlogs as of Aug. 31 amounted to 1,369,692 tons. This compares with 2,131,665 a year ago, and with 1,287,828 tons for the average on Aug. 31 for 1947-1950.

Steel Bars . . .

Bar Prices, Page 174

Carbon bar business is beginning to stir a little. In part, this reflects rising automotive demand, but other consuming lines also are showing slightly more interest in covering their requirements.

The pickup in buying is nothing to shout about, being spotty for the most part. But it is providing an encouraging note.

Improvement in demand is noticeable in all categories. Deliveries are easy—cold drawn as well as hot-rolled stock. One eastern cold-drawer is able to deliver 40 per cent of orders from stock with deliveries on the remainder ranging to about four weeks.

Except for demand from the automotive industry, that from other major consuming lines is not sufficient to attract much attention. Farm implement manufacturers are important bar consumers running well below capacity.

The Fairless, Pa., Works of U.S. Steel Corp. has discontinued production of hot-rolled square bars because of low demand. If demand revives, the Fairless plant could resume production. It made squares in sizes of ½, ⅝, ¾, 1 and 1¼-in. U. S. Steel's plant nearest the east now producing those sizes of square bars is at Youngstown.

Tool Steel . . .

Tool Steel Prices, Page 178

Shipments of high speed and tool steel (excluding hollow drill steel) scored an encouraging increase in August (compared with July) but were sharply below shipments in August, 1953.

August movement was 6475 net tons against 5277 tons in July and 9270 tons in August, 1953. Cumulative shipments to the end of August this year amount to 56,665 net tons, comparing with 81,744 last year.

Tin Plate . . .

Tin Plate Prices, Page 176

Recognizing a technological advance, STEEL is now quoting prices on electrotin, a new product.

Electrotin is electrolytically coated black plate, 22 to 27 gage, both inclusive. It is heavier than the common electrolytic tin plate (heaviest of it is 28 gage).

Chief use of electrotin is in air and oil filters for automobiles, where ordinary tin plate is not thick enough. It is expected to find uses in places where corrosion resistance must be provided with heavy stock coated with tin.

Electrotin is priced on a hundredweight basis rather than on the base box basis of tin plate. Base price of 0.25 lb tin coating is $6.175 per 100 lb; 0.50 lb is $6.375; and 0.75 lb is $6.575.

Producers of this new product are Jones & Laughlin Steel Corp. at its Aliquippa, Pa., plant; and Republic Steel Corp. at its Niles, O., plant.

Steel Import Prices

(Base, per 100 lb, landed, duty paid)

	North Atlantic	South Atlantic	Gulf Coast	West Coast*
Deformed Bars, Intermediate, ASTM-A-305	$4.95	$4.95	$4.85	$5.23
Bar Size Angles	4.55	4.55	4.50	4.93
Structural Angles	4.55	4.55	4.50	4.93
I-Beams	4.40	4.40	4.35	4.73
Wide Flange Beams	4.80	4.80	4.80	5.08
Sheet and Plate, 10 gage, 11 gage, 8' x 10'	5.50	5.50	5.45	5.78
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	26.80	27.00	26.80	27.60
Barbed Wire	6.05	6.05	6.05	6.23
Merchant Bars	4.95	4.95	4.85	5.33
Hot-Rolled Bands	5.15	5.15	5.10	5.43
Wire Rods, Thomas Commercial No. 5	5.10	5.17	5.15	5.42
Wire Rods O-H Cold Heading Quality No. 5	5.23	5.30	5.28	5.55
Bright Common Wire Nails	6.85	6.95	6.90	7.15

*Not including $2.20 per net ton customarily charged in most West Coast ports for wharfage and handling.

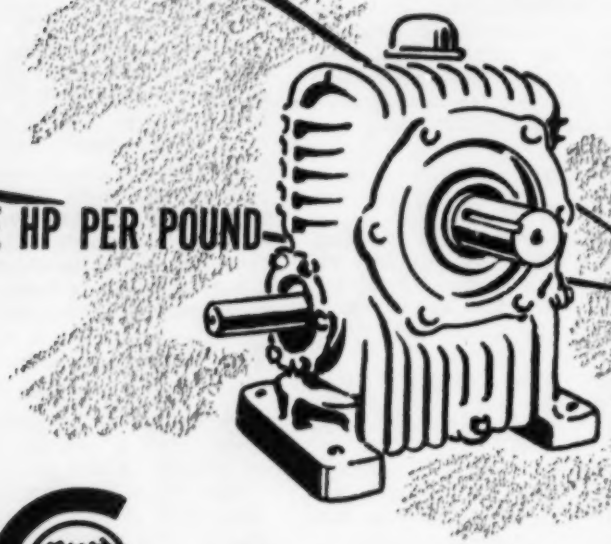
Sizes OD				
Seamless A.P.I. Casing, Grade J-55:				
5½ in.	15.5	$1.47/ft	$1.51/ft	$1.32/ft
7 in.	23	2.10/ft	2.17/ft	1.90/ft
Seamless N-80 Casing:				
5½ in.	17	1.94/ft	2.00/ft	1.75/ft
7 in.	23	2.50/ft	2.70/ft	2.36/ft
Seamless J-55 Tubing:				
2⅜ in.	4.7	0.60/ft	0.62/ft	0.55/ft
2⅞ in.	6.5	0.80/ft	0.83/ft	0.73/ft

Sources of shipment: Western continental European (Schuman Plan) countries.

★ MORE HP PER DOLLAR

★ MORE HP PER POUND

★ MORE HP PER CU. IN.



☆ with the finest speed reducers available—Cone-Drive double-enveloping worm gear speed reducers. You get high load capacity, long life and light weight, all in an extremely compact package.

Available capacities from fractional to 800 hp; ratios from 5:1 to 4900:1; over 190,000 standard stock models to choose from. Ask for Bulletin 8901-50.

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DOUBLE ENVELOPING GEAR SETS & SPEED REDUCERS

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Oil or Water Combination Quench Tank

increases the versatility of the

AGF ROTARY RETORT FURNACE

Installed in the Russell, Burdsall & Ward, Bolt and Nut Co. plant in Port Chester, N.Y., this equipment continuously "Ni-Carbo"* from 400 to 1000 lbs. of nuts, bolts or screws.

Mounted on car wheels and track, the double quench tank extending to the floor below, provides either water or oil (sealed) quench.

Completely automatic operation from main floor controls for heating cycle regulation as well as for quench changes. This furnace installation virtually insures individual heat treating attention to each piece—no matter how small the piece nor high the production.

*The Original Ammonia-Gas Case Hardening Process.

Write today for latest Bulletins illustrating and describing the many advantageous features of AGF Rotary Retort Furnaces and Automatic Quench Tanks.

VISIT AGF AT THE METAL SHOW BOOTH NO. 843H

AMERICAN GAS FURNACE CO.

996 LAFAYETTE ST., ELIZABETH 4, N. J.

Ores

Lake Superior Iron Ore

(Prices effective July 1, 1953, and thereafter; gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$10.30
Old range nonbessemer	10.15
Mesabi bessemer	10.05
Mesabi nonbessemer	9.90
Open-hearth lump	11.15
High phosphorus	9.90

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon which were in effect on June 24, 1953, and increases or decreases after such date are for buyer's account.

Eastern Local Iron Ore

Cents per unit deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%	20.00
N. African hematite (spot)	nom. 20.00-22.00
Brazilian iron ore, 68-69% (spot)	25.00

Tungsten Ore

Net ton unit, before duty

Foreign Wolframite, good commercial quality	$24.00-25.00
Domestic scheelite, mine	63.00

Manganese Ore

Mn 48%, nearby, 90c-92c per long ton unit c.i.f. U. S. ports, duty for buyer's account: 46-47%, 86c-83c.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $40.00-$42.00
48% 3:1	42.00-44.00
48% no ratio	32.00-34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	nom. 34.00

Domestic
(Rail nearest seller)

48% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb, Mo content mines, unpacked	$1.00

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

50-60%	$3.80-$4.20
60-65%	4.65-4.75

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills

Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Pueblo, Colo., $94; Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., Woodbridge, N. J., $114; Salina, Pa., $119; Niles O., $125; Los Angeles, Pittsburg, Calf., $137.20.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Portsmouth, O., $120; Warren, Niles, O., Hays, Pa., $125; Morrisville, Pa., $123.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $130; Cutler, Utah, $121.55; Los Angeles, $127.85.

Insulating Fire Brick (per 1000)

2300° F: Massillon, O., $178.50; Clearfield, Pa., $213; Augusta, Ga., Beaver Falls, Zelienople, Pa., Maxico, Mo., $206; Vandalia, Mo., $214.10; Portsmouth, O., $207.50; Bessemer, Ala. $212.80.

Ladle Brick (per 1000)

Dry Pressed. Bessemer, Ala., $84.60; Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Wellsville, O., $77.50; Mexico, Mo., $73.50; Clearfield, Pa., Portsmouth, O., $83; Perla, Ark., $109; Los Angeles, $110.25; Pittsburg, Calif., $111.30

High-Alumina Brick (per 1000)

50 Per Cent: Clearfield Pa., St. Louis, Mexico, Mo., $181; Danville, Ill., $169.30.
60 Per Cent: St. Louis, Mexico, Vandalia, Mo., Clearfield, Pa., $225; Danville, Ill., $213.20.
70 Per Cent: St. Louis, Mexico, Vandalia, Mo., $260; Danville, Ill., $258; Clearfield, Pa., $267.

Sleeves

Reesdale, Pa., $139.70; Johnstown, Pa., $140; Clearfield, Pa., $148.50; St. Louis, $151.80; Athens, Tex., $155.

Nozzles

Reesdale, Pa., $223.50; Johnstown, Pa., $229.20; Clearfield, Pa., $241.40; St. Louis, $247.10; Athens, Tex., $247.70.

Runners

Reesdale, Pa., $174; Johnstown, Pa., $177.80; Clearfield, Pa., $185.50; St. Louis, $187.30; Athens, Tex., $191.40

Dolomite

Domestic dead-burned bulk; Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettaville, Millersville, Martin, Narlo, Gibsonburg, Woodville, O., $14.50; Thornton, McCook, Ill., $15.10; Dolly Siding, Bunne Terre Mo., $13.65.

Magnesite (per net ton)

Domestic, deadburned bulk, ¾-in. grains with fines: Luning, Nev., Chewelah, Wash., $38.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	*$13.50-$14.00*
Connellsville, foundry	16.50-17.00

Oven Foundry Coke

Kearny, N. J., ovens	$24.00
Everett, Mass., ovens	
New England, deld.	*26.05
Chicago, ovens	24.50
Chicago, deld.	26.00
Terre Haute, ovens	24.05
Milwaukee, ovens	25.25
Indianapolis, ovens	24.25
Chicago, deld.	26.12
Cincinnati, deld.	25.85
Painesville, O., ovens	25.50
Cleveland, deld.	27.43
Erie, Pa., ovens	25.00
Birmingham, ovens	22.65
Cincinnati, deld.	27.58
Buffalo, ovens	25.00
Buffalo, deld.	26.25
Lone Star, Tex., ovens	18.50
Philadelphia, ovens	23.00
Swedeland, Pa., ovens	23.00
St. Louis, ovens	
St. Louis, deld.	26.00
St. Paul, ovens	23.75
Portsmouth, O., ovens	24.00
Cincinnati, O. deld.	26.62
Detroit, ovens	25.50
Detroit, deld.	26.50
Pontiac, deld.	27.06
Saginaw, deld.	28.58

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzol	40.00
Toluol, one deg	32.00-35.00
Industrial xylol	32.00-35.00

Per ton, bulk, ovens

Sulphate of ammonia	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol 40 deg. (U.S.P.), tank cars	18.00
c.l. drums	19.00
l.c.l. drums	19.50

Fluorspar

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4	40	26.00
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7, 8, 9, 10	60	21.00
12, 14	72	20.50
16	72	20.00
17	60	20.50
18	72	20.00
20	72	20.00

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40, 35, 30	110	8.95
30	84	9.10
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24	72, 84	9.10
20	90	8.95
20	84	9.10
17	72	9.10
17	60	9.50
14	72	9.50
14, 12, 10	60	10.30
8	60	10.55

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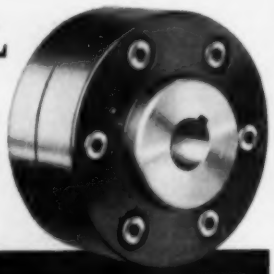

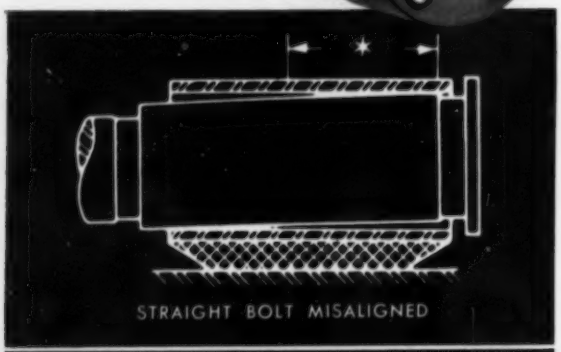

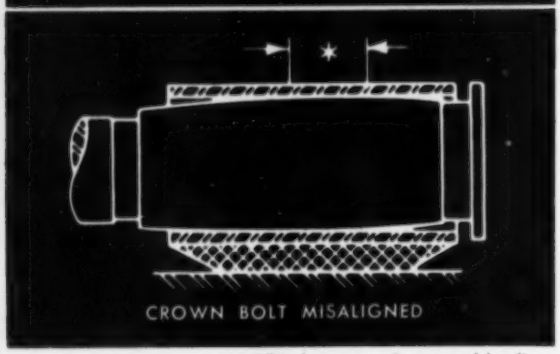

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MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si). Carlot per gross ton $86, Palmerton, Pa.; $87 Clairton and Duquesne, Pa.

(16 to 19% Mn) $84 per ton, Palmerton, Pa.; $85 per ton, Clairton and Duquesne, Pa.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.). Base price per net ton $190, Clairton, Duquesne, Johnstown and Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, Philo, O.; Sheffield, Ala.; Portland, Oreg., and Tacoma, Wash. Add or subtract $2.00 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%) Lump $198 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 76%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 29.95c per lb of contained Mn, carload packed 30.7c, ton lots 31.8c, less ton 33c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices 3c for max. 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max). Carload, lump, bulk 21.35c per lb of contained Mn, carload packed 22.1c, ton lot 23.2c, less ton 24.4c. Delivered. Spot, add 0.25c.

Manganese metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max): Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electromanganese: Min carloads, 30c; 2000 lb to min carloads, 32c; 250 lb to 1999 lb 34c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-85%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 11.00c per lb of alloy, carload packed, 11.75c, ton lots 12.65c, less ton 13.65c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $177 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $195 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 24.75c per lb of contained Cr; c.l. packed 25.65c, ton lot 26.80c, less ton 28.20c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.025% C (Simplex) 34.50c per lb contained Cr, 0.03% C 36.50c, 0.04% C 35.50c, 0.06% C 34.50c, 0.10% C 34.00c, 0.15% C 33.75c, 0.20% C 33.50c, 0.50% C 33.25c, 1% C 33.00c, 1.50% C 32.85c, 2% C 32.75c. Carload packed add 1.1c, ton lot 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%). Contract, c.l. S M x D, bulk, 26.25c per lb contained Cr. Packed, c.l. 27.15c, ton 28.50c, less ton 30.25c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, S M x D, 18.35c per lb of alloy; ton lot 19.2c; less ton lot, 20.4c, delivered; spot, add 0.25c.

Low-Carbon Ferrochrome Silicon: (Cr 34-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 24.75c per lb of contained chromium plus 12c per pound of contained silicon; 1" x down, bulk 24.90c per pound of contained chromium plus 12.2c per pound of contained silicon. F.o.b. plant; freight allowed to destination.

Chromium Metal: (Min 97% Cr and 1% Fe). Contract, 1" x D; packed, max 0.50%, carload $1.16, ton lots $1.18; less ton $1.20. Delivered. Spot, add 5c. Prices on 0.10 per cent carbon grade, add 9c to above prices.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 35-55%, Si 8-12% max, C 3-3.5% max). Contract, any quantity, $3.00 per lb of contained V. Delivered. Spot, add 10c. **Crucible-Special Grades** (V 50-55%, Si 2-3.5% max, C 0.5-1% max). $3.10. **Primos and High Speed Grades** (V 50-55%, Si 1.50% max, C 0.20% max) $3.20.

Grainal: Vanadium Grainal No. 1, $1 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.28 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si, packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12c per lb of contained Si, carload packed 13.6c, ton lot 15.05c, less ton 16.7c Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.7c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per pound contained silicon; carload packed 14.85c; ton lots, 16.05c; less ton 17.4c, delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 14.4c per lb of contained Si, carload packed 15.7c, ton lot 16.85c, less ton 18.1c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 17.25c per lb of contained Si, carload packed 18.45c, ton lot 19.4c, less ton 20.45c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 97% Si and 1% max Fe). C.l. lump, bulk, regular 18.5c per lb of Si, c.l. packed 19.7c, ton lot 20.6c, less ton 21.6c. Add 0.5c for max. 0.10% calcium grade. Deduct 0.5c for max 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.25c per lb of alloy, ton lots packed 10.15c, 200 to 1999 lb 10.50c, smaller lots 11c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 30-43%, Fe 40-45%, C 0.20% max). Contract, c.l. lump, bulk 8.0c per lb of alloy, c.l. packed 8.75c, ton lot 9.5c, less ton 10.35c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 25.25c per lb of alloy, ton lot 26c, less ton 27.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min M) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) Contract, lump, carloads 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 20.0c per lb of alloy, carload packed 20.8c, ton lot 22.3c, less ton 23.3c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 19.0c per lb of alloy, carload packed 20.2c, ton lot 22.1c, less ton 23.6c. Deld. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 16.25c per lb of briquet, carload packed 16.95c, ton 17.75c, less ton 18.65c. Deld. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 12.05c per lb of briquet, c.l. packaged 12.85c, ton lot 13.65c, less ton 14.55. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 12.65c per lb of briquet, c.l. packaged 13.45c, ton lot 14.25c, less ton 15.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.75c per lb of briquet. Packed c.l. 7.55c, ton lot 8.35c, less ton 9.25c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.9c. Packaged c.l. 7.7c, ton lot 8.5c, less ton 8.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.14 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.80 per lb of contained W; 2000 lb W to 5000 lb W, $3.90; less than 2000 lb W, $4.02, f.o.b. Niagara Falls, N. Y.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 56-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $12 per lb of contained Cb, less ton $12.05. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min, C 0.30% max) ton lots, 2" x D, $6.25 per lb of contained Cb plus Ta, deld.; less ton lots $6.30.

Silicax Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed 1" x D, 45c per lb of alloy, ton lot 47c, less ton 49c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 17.5c per lb of alloy, ton lots 18.25c, less ton 19.5c. Deld. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.50c per lb of alloy; ton lots 18.50c; less ton lots 20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 16.6c per lb of alloy; ton lots 18.10c; less ton lots 19.35c, f.o.b. Niagara Falls; freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 15.50c. Packed c.l. 16.50c, 2000 lb to c.l. 16.75c, less than 2000 lb 17.25c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carloads, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, f.o.b. Langeloth, Pa., $1.32 in all sizes except powdered which is $1.41; Washington, Pa., furnace, any quantity $1.32.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa., $1.14 in cans; in bags, $1.13, f.o.b. Langeloth, Pa.; Washington, Pa., $1.13.

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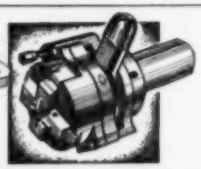

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Wire . . .

Wire Prices, Page 176 & 177

There is a bit more sparkle to wire demand. Buying is moderately heavier, though not enough to swell mill backlogs or extend deliveries markedly.

Consumers' inventories are down, and, in many cases, have reached the point where prompt shipments are needed to sustain manufacturing schedules.

Mill bookings extend a little deeper into October schedules and orders for November shipment are up some. But there are numerous openings in October schedules, though prompt shipments of manufacturers wire are becoming slightly more difficult.

Warehouse . . .

Warehouse Prices, Page 179

Following the trend started in the East last month, (see STEEL, Sept. 27, p. 143) steel distributors in all sections of the country (except the West Coast) have revised quantity deduction schedules on hot-rolled products as well as cold-finished bars and cold-rolled sheets. Base tonnage is 2000 to 4999 lb against 2000 to 9999 lb formerly. Under the new schedules a 5000-to-9999-lb, bracket is set up, commanding a deduction of 10 cents from base; 10,000 to 19,999 lb gets 30 cents off; 20,000 to 29,999 lb gets 50 cents off; over 30,000 lb, the deduction is 70 cents.

The move amounts to a price reduction ranging from $2 to $4 a ton, depending on quantity. It's a competitive manuever to bring warehouse prices on hot-rolled products more in line with mill prices and to bring the schedules closer to truck-load limits. Such business in recent months has tended to revert to the mills on an increasing scale. Also, in the East especially, the lower prices on larger lots strengthens the distributors' position in competition with imported material.

U. S. Steel Supply Division and Joseph T. Ryerson & Son Inc. have instituted the new schedule in their warehouses, except on the West Coast. One warehouseman has described the movement as "creeping" across the nation after its start in Philadelphia.

Joseph T. Ryerson & Son last week put into effect a county delivered pricing system in the state of Ohio. Under this method the lowest published truck rate from the nearest governing supply point is used to determine the published county price at which Ryerson will deliver steel in the state.

For example, if Pittsburgh is the governing supply point in servicing a particular area of the state, the Pittsburgh base price, plus the lowest truck rate from that point, establishes the delivered county price.

Tubular Goods . . .

Tubular Goods Prices, Page 178

Oil country pipe orders are coming in steadily to producers, but mills note they are being placed with decreased lead-time. Demand for welded line pipe is strong, while welded and seamless tube sales show little change from the general market pattern.

Buyers do appear more inventory-conscious than they were some time back. But demand for tubular specialties is perking up after a long period of sluggish buying. Improvement is noted in mechanical tubing more than pressure grades. Butt-weld and seamless pipe are somewhat less active, but this may be temporary, since heating requirements usually push demand for these items up about this season.

Pig Iron . . .

Pig Iron Prices, Page 179

Foundry operations, especially in the Midwest, are beginning to expand as a forerunner of heavier castings requirements for new automobile models. It is seen in the rising sales of pig iron. Most sellers anticipate improved business in October over the low third-quarter level.

Continuation of the increase in scrap prices recorded in recent weeks will result in greater use of pig iron in fourth quarter.

Less foreign iron is being offered in New York. Some Spanish intermediate low phosphorus iron was sold recently for special requirements at about $11 a ton, delivered, below the domestic market.

Steelmaking demand for pig iron is better, but foundry requirements continue to fall short of expectations. A Buffalo merchant iron producer plans barge shipment of iron to the eastern seaboard for warehouse stock to care for customers' requirements this winter.

Iron Ore . . .

Iron Ore Prices, Page 185

Only 1,806,168 gross tons of iron ore were shipped from the head of the Great Lakes in the week ended Oct. 4. This compares with 2,886,356 moved in the like week of 1953. Cumulative shipments in the 1954 season to Oct. 4 were 51,496,763 tons, against 80,437,779 in the same period last year.

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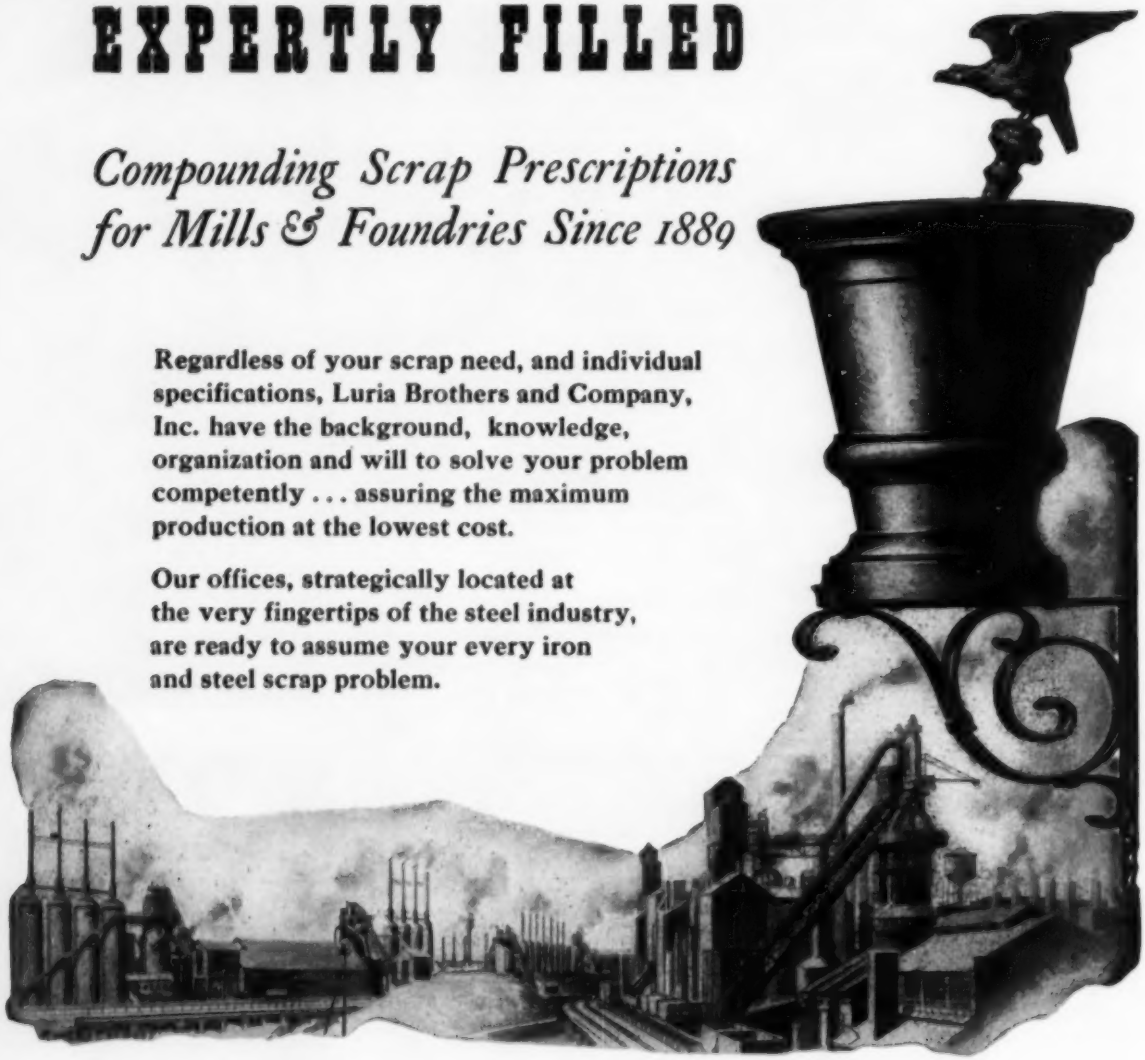

Regardless of your scrap need, and individual specifications, Luria Brothers and Company, Inc. have the background, knowledge, organization and will to solve your problem competently . . . assuring the maximum production at the lowest cost.

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

EXPORTS-IMPORTS—LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* FORENTRACO

Scrap . . .

Scrap Prices, Page 192

Philadelphia — Domestic consumers of steel scrap show increasing interest. In competition with export demands, they are paying substantially higher for most leading grades. Purchases of No. 1 heavy melting and No. 1 bundles have recently been made at $30.50 delivered, No. 2 heavy melting at $28.50 and No. 2 bundles at $25.

Grades not directly affected by export demand also are moving upward.

Steel scrap is being purchased in this country by Italy, Spain, West Germany, Belgium and England. Normally, Germany supplies Italy with considerable scrap.

Pittsburgh — A major consumer's long-awaited purchase of bast furnace scrap in P.ttsburgh came through last week and had the expected effect. Price of No. 1 heavy melting scrap rose $2 a ton ($32 to $33). No. 2 heavy melting also rose $2 ($29 to $30). Price of turnings increased $1 a ton, while other blast furnace grades also advanced.

New York—Brokers again advanced their prices on several grades of steel scrap as a further reflection of strong demand from abroad with a quickening of interest on domestic account. They are offering to pay $26 for No. 1 heavy melting steel and No. 1 bundles, $24 for No. 2 heavy melting and $20 for No. 2 bundles. This is a $1 increase for the first three items and $2 for the fourth. They have also advanced their buying prices on low phos structurals and plate $1, to a range of $29 to $30. All other grades are unchanged.

Buffalo—Price advances running up to $2 per ton were registered last week in an excited scrap market. Buying was reported both from local sources and Valley consumers. Valley mills are reported paying $31 per ton for top quality steelmaking grades, freight charges not included.

Bullish undertone was enhanced by an extension of the upturn in ingot production. Dealers are buying supplies, which are none too plentiful. Sustained movement of cast grades across the border, mostly in truck lots, boosted No. 1 cupola cast $1 per ton.

Boston—Several steel scrap grades are up $1 to $1.50 per ton for both export and domestic shipment. No. 1 heavy melting for eastern consumption moved up to $22, f.o.b. shipping point; while $26.50, even slightly better, is being paid at dock.

Cleveland—Wave of bullishness has hit the scrap market here and in the Valley, with steel mill operations tending upward and buyers showing more interest in dealer scrap than they have for several months. Based on sales at prices between $31 and $33, steelmaking grades are up about $1 from a week ago. Blast furnace grades also are up $1 on the average. The cast grades, except for No. 1 cupola, which moved upward to a range of $44 to $45, are unchanged.

Detroit—Although they still hold large inventories, all local scrap consumers are again in the market.

Chicago — Strength continues to mount in iron and steel scrap. Part of it comes from a rising steelmaking rate—5 points in the last four weeks—but major support seems predicated on a more optimistic outlook.

Scrap futures for the week ending Oct. 5 on the Chicago Mercantile Exchange were: High bid for January, $39.25, total sales 20 contracts; high bid for March, $38.50, total sales 7 contracts.

Cincinnati—The scrap market came to life last week. Buying interest was transferred from industrial lists to dealer scrap, pushing prices higher. No. 1 open hearth grades advanced $1 a ton to $26.50 to $27.50. No. 2 heavy melting climbed $1 to $23.50 to $24.50, while No. 2 bundles rose 50 cents to $19.50 to $20.50.

San Francisco — Hyman-Michaels Co. is closing its scrap iron yards here and in Los Angeles.

Seattle—Scrap supply and demand are in balance. Dealers are selling out of inventory and are not adding appreciably to stocks.

Canada . . .

Production of ingots and steel for castings in Canada during July was 260,454 net tons, compared with 267,080 in June and 323,385 in July a year ago.

July output of pig iron in the Dominion amounted to 174,403 net tons against 167,211 in June and 272,958 in July, 1953.

August Steel Shipments Gain

Shipments of finished steel increased 191,000 net tons from July to August to a total of 4,681,000 net tons, reports the American Iron & Steel Institute. Thirteen of 20 industrial classifications took more steel during the month than in July.

The auto industry took 656,000 tons in August against 707,000 the month preceding. This industry's total in eight months of 1954 was 7.4 million tons against 10.7 million in the like period of 1953.

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Oct. 6	$32.00
Sept. 29	30.50
Sept. Avg.	29.94
Oct., 1953	32.75
Oct. 1949	26.71

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

(Delivered consumer plant)

No. 1 heavy melting	*32.00-33.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 bundles	*32.00-33.00*
No. 2 bundles	*26.00-27.00*
No. 1 busheling	*31.00-32.00*
Machine shop turnings	*17.00-18.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	*20.00-21.00*
Cast iron borings	18.00-19.00
Cut structurals, 5 ft lengths	*33.00-34.00*
Heavy turnings	26.00-27.00
Punchings & plate scrap	*35.00-36.00*
Electric furnace bundles	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	37.00-38.00
Charging box cast	32.00-33.00
Heavy breakable cast	*31.00-32.00*
Unstripped motor blocks	23.00-24.00
No. 1 machinery cast	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt.	33.00-34.00
Rails, 2-ft and under	43.00-44.00
Rails, 18-in. and under	44.00-45.00
Rails, random lengths	37.00-38.00
Railroad specialties	35.00-36.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-190.00
18-8 turnings	85.00-90.00
430 bundles & solids	65.00-70.00
430 turnings	50.00-52.00

CLEVELAND

(Delivered consumer plant)

No. 1 heavy melting	*31.00-33.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 bundles	*31.00-33.00*
No. 2 bundles	25.00-26.00
No. 1 busheling	*31.00-33.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	*19.00-20.00*
Short shovel turnings	*19.00-20.00*
Cast iron borings	*19.00-20.00*
Low phos.	32.00-33.00
Cut structural plate 2 ft and under	36.00-37.00
Alloy free, short shovel turnings	20.00-21.00
Electric furnace bundles	*31.00-33.00*

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Charging box cast	27.50-28.50
Stove plate	34.00-35.00
Heavy breakable cast	26.50-27.50
Unstripped motor blocks	25.00-26.00
Brake shoes	30.00-31.00
Clean auto cast	44.00-45.00
No. 1 wheels	36.00-37.00
Burnt cast	28.00-29.00
Drop broken machinery	*44.00-45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*34.00-35.00*
R.R. malleable	43.00-44.00
Rails, 3-ft and under	45.00-46.00
Rails, 18 in. and under	47.00-48.00
Rails, random lengths	42.00-43.00
Cast steel	36.00-37.00
Railroad specialties	36.00-37.00
Uncut tires	37.00-38.00
Angles, splice bars	42.00-43.00
Rails, rerolling	50.00-51.00

Stainless Steel

(F.o.b. shipping point)

18-8 bundles, solids	nom. 160.00-170.00
18-8 turnings	nom. 70.00-80.00
430 clips, bundles, solids	nom. 70.00
430 turnings	40.00-50.00

YOUNGSTOWN

(Delivered consumer plant)

No. 1 heavy melting	*34.00-36.00*
No. 2 heavy melting	*28.00-30.00*
No. 1 bundles	*34.00-36.00*
No. 2 bundles	*25.00-26.00*
Machine shop turnings	14.00-15.00
Short shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	*34.00-36.00*
Electric furnace bundles	*34.00-36.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00-36.00*

PHILADELPHIA

(Delivered consumer plant)

No. 1 heavy melting	*30.50*
No. 2 heavy melting	*28.50*
No. 1 bundles	*30.50*
No. 2 bundles	*25.00*
No. 1 busheling	28.50-29.00*
Electric furnace bundles	*31.50*
Machine shop turnings	*16.50-17.00*
Mixed borings, turnings	15.00
Short shovel turnings	20.00
Structurals & plate	*33.00*
Heavy turnings	*28.00*
Couplers, springs, wheels	*33.00*
Rail crops, 2 ft & under	*43.00-44.00*

Cast Iron Grades

No. 1 cupola	35.00-36.00
Malleable	37.00*
Heavy breakable cast	*36.00*
Unstripped motor blocks	nom.
Drop broken machinery	41.00-42.00

*Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*26.00*
No. 2 heavy melting	*24.00*
No. 1 bundles	*26.00*
No. 2 bundles	*20.00*
Machine shop turnings	8.00-8.50
Mixed borings, short turnings	11.00-12.00
Low phos. (structural & plate)	*29.00-30.00*
Short shovel turnings	11.00-12.00

Cast Iron Grades

No. 1 cupola	29.00-30.00
Unstripped motor blocks	19.00-20.00*

Stainless Steel

18-8 sheets, clips, solids	170.00-175.00
18-8 borings, turnings	70.00-75.00
430 sheets, clips, solids	40.00
410 sheets, clips, solids	30.00

*Nominal.

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*22.00**
No. 2 heavy melting	*18.00*
No. 1 bundles	*22.00*
No. 2 bundles	*15.50-16.00*
Mixed borings, turnings	*10.00-10.50*
Machine shop turnings	*7.00 7.50*
Short shovel turnings	*11.00-11.50*
No. 1 cast	29.00-30.00
Mixed cupola cast	27.00-28.00
No. 1 machinery cast	32.00-33.00

* $4 to $4.50 higher for export.

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*26.50-27.50*
No. 2 heavy melting	*23.50-24.50*
No. 1 bundles	*26.50-27.50*
No. 2 bundles	*19.50-20.50*
No. 1 busheling	*26.50-27.50*
Machine shop turnings	*14.50-15.50*
Mixed borings, turnings	14.50-15.50
Short shovel turnings	14.50-15.50
Cast iron borings	14.50-15.50
Low phos. 18-in.	*34.00-35.00*

Cast Iron Grades

No. 1 cupola	*39.00*
Heavy breakable cast	*36.00*
Charging box cast	36.00
Drop broken machinery	*45.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00-33.00*
Rails, 18-in. and under	*46.00-47.00*
Rails, random lengths	*38.00-39.00*

CHICAGO

No. 1 heavy melting	*32.00-34.00*
No. 2 heavy melting	*30.00-31.00*
No. 1 factory bundles	33.00-34.00
No. 1 dealer bundles	30.00-31.00
No. 2 bundles	*23.50-24.50*
No. 1 busheling	*32.00-34.00*
Machine shop turnings	*17.00-18.00*
Mixed borings, turnings	*19.00-20.00*
Short shovel turnings	*19.00-20.00*
Cast iron borings	*19.00-20.00*
Cut structurals, 3-ft	*34.00-35.00*
Punchings & plate scrap	34.00-35.00
Electric furnace bundles	34.00-35.00

Cast Iron Grades

No. 1 cupola	*39.00-40.00*
Stove plate	*33.00-34.00*
Unstripped motor blocks	25.00-26.00
Clean auto cast	*42.00-44.00*
Drop broken machinery	*42.00-44.00*

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00
R.R. malleable	*42.00-44.00*
Rails, 2-ft and under	48.00-49.00
Rails, 18-in. and under	49.00-50.00
Angles, splice bars	42.00-43.00
Rails, rerolling	50.00-53.00

Stainless Steel Scrap

18-8 clips & solids	130.00-140.00
18-8 turnings	60.00
430 clips & solids	40.00
430 turnings	20.00-25.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*25.00*
No. 2 heavy melting	*21.50*
No. 1 bundles	*27.50*
No. 2 bundles	*20.00*
No. 1 busheling	*26.00*
Machine shop turnings	*12.00*
Mixed borings, turnings	*12.00*
Short shovel turnings	*16.00*
Punchings & plate scrap	*27.00*

Cast Iron Grades

No. 1 cupola	*34.00*
Charging box cast	27.00
Stove plate	*30.00*
Heavy breakable	*25.00*
Unstripped motor blocks	*20.00*
Clean auto cast	*38.00*
Malleable	*30.00*

BUFFALO

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*24.50-25.50*
No. 1 bundles	*30.00-31.00*
No. 2 bundles	*22.50-23.50*
No. 1 busheling	*30.00-31.00*
Machine shop turnings	*15.50-16.50*
Mixed borings, turnings	*17.50 18.00*
Short shovel turnings	*18.50-19.00*
Cast iron borings	*17.50 18.00*
Low phos.	*32.00-33.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	*36.00-37.00*
No. 1 machinery	*40.00-41.00*

Railroad Scrap

Rails, random lengths	*34.00-35.00*
Rails, 3 ft and under	*41.00-42.00*
Railroad specialties	*35.50-36.50*

BIRMINGHAM

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	18.00-19.00
No. 2 bundles	21.00-22.00
Cast iron borings	16.00-17.00
Short shovel turnings	16.00-17.00
Machine shop turnings	15.00-16.00
Electric furnace bundles	25.00-29.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	45.00-46.00
Stove plate	42.00-43.00
Bar crops and plate	30.50-31.50
Structural plate, 2 ft	30.50-31.50
Unstripped motor blocks	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	28.00-29.00
Rails, 18-in. and under	39.00-40.00
Rails, rerolling	40.00-41.00
Angles, splice bars	37.50-38.50
Stand. steel axles	35.00-36.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*30.00*
No. 2 heavy melting	*28.00*
No. 1 bundles	*30.00*
No. 2 bundles	*24.00*
Machine shop turnings	14.00
Short shovel turnings	16.00

Cast Iron Grades

No. 1 cupola	38.00
Charging box cast	29.00
Heavy breakable cast	29.00
Unstripped motor blocks	29.00
Brake shoes	30.00
Clean auto cast	40.00
Stove plate	*34.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00*
Rails, 18-in. and under	*46.00*
Rails, random lengths	*45.00*
Rails, rerolling	*53.50*
Angles, splice bars	*42.00*

SEATTLE

(Delivered consumer plant)

No. 1 heavy melting	25.00
No. 2 heavy melting	21.00
No. 1 bundles	21.00
No. 2 bundles	17.00
No. 3 bundles	13.00
Machine shop turnings	*12.00*
Mixed borings, turnings	*12.00*
Short shovel turnings	*12.00*
Electric furnace, No. 1	32.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	34.00-35.00
Heavy breakable cast	23.00
Unstripped motor blocks	23.00
No. 1 wheels	21.00
Stove plate(f.o.b. plant)	28.00
Brake shoes	28.00

Railroad Scrap

(Delivered consumer plant)

Rails, random lengths	30.00-34.00

LOS ANGELES

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	20.00
No. 2 bundles	16.00
Machine shop turnings	5.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	42.00-44.00

SAN FRANCISCO

No. 1 heavy melting	20.00
No. 2 heavy melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 1 busheling	20.00
Machine shop turnings	5.00
Mixed borings, turnings	5.00
Short shovel turnings	9.00
Cast iron borings	9.00
Cut structurals	25.00
Heavy turnings	9.00
Punchings & plate scrap	25.00
Electric furnace bundles	19.00

Cast Iron Grades

No. 1 cupola	43.00-46.00
Charging box cast	35.00
Stove plate	37.00
Heavy breakable cast	36.00
Unstripped motor blocks	30.00
Brake shoes	35.00
Clean auto cast	39.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	43.00

HAMILTON, ONT.

(Delivered prices)

No. 1 heavy melting	$22.00
No. 2 heavy melting	19.00
No. 1 bundles	22.00
No. 2 bundles	17.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Rails, remelting	32.00
Busheling, new factory: Prepared	20.00
Unprepared	16.00
Short steel turnings	12.00

Cast Iron Grades†

No. 1 machinery cast	42.00-45.00

†F.o.b., shipping point.

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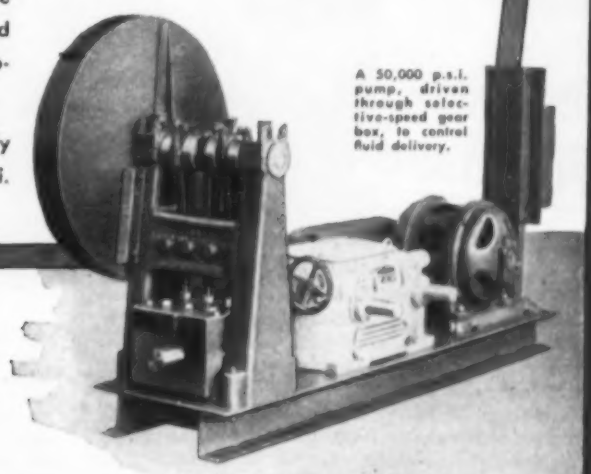

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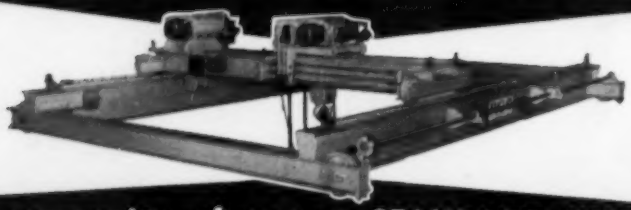

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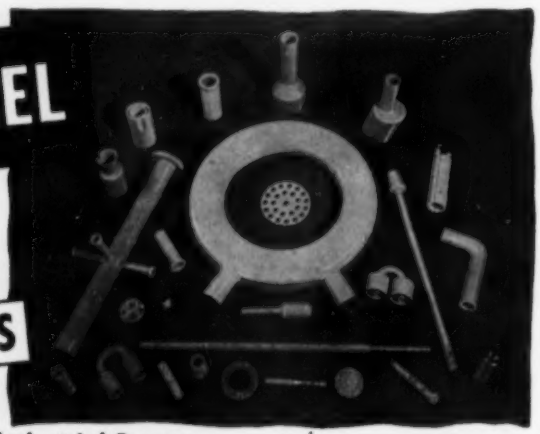

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BEAVER FALLS, PENNA.

ing the oil industry, received 812,000 tons, slightly less than in July. They received 6.6 million tons in the first eight months of the year.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

660 tons, state bridge, Delaware county, Pa., to Mayer-Pollock, Pottstown, Pa.

495 tons, section, Bronx-Queens expressway, New York, through the Brookfield Construction Co., to the Harris Structural Steel Co., New York.

300 tons, Lehigh Valley Railroad terminal, East Buffalo, N. Y., to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, multiple purpose hangar, Larson Air Base, Washington state, reported to an Oklahoma interest; general contract to D. M. Drake Co. and George A. Fuller, Portland, Oreg., low at $497,000 to U. S. Engineer, Walla Walla, Wash.

125 tons, shopping center, northern Maryland, to Belmont Iron Works, Eddystone, Pa.

105 tons, state highway bridges, Killingly, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Jones Construction Co., Columbia, Conn., general contractor; 65 tons, reinforcing, Plantations Steel Co., Providence, R. I.

95 tons, city bridge, Renton, Wash., to Poole, McGonigle & Dick, Portland, Oreg.; also 20 tons of reinforcing to Soule Steel Co., Seattle; Rumsey & Co., Seattle, general contractors.

STRUCTURAL STEEL PENDING

3800 tons, bridge superstructure, Connecticut river, West Springfield-Chicopee, Massachusetts Turnpike Authority; American Bridge Division, U. S. Steel Corp., Pittsburgh, low.

2100 tons, double cantilever maintenance hangar, Pope Air Field Base, Ft. Bragg, N.C.; bids Oct. 26, Corps of Engineers, Wilmington, N. C.

2000 tons, maintenance hangar, naval air station, Brunswick, Me.; bids Oct. 19, Corps of Engineers, Boston.

940 tons, angles, 8 to 16-ft lengths, Air Force Depot, Topeka, Kans.; bids Oct. 18, Inv. 99-B.

700 tons, temporary bridge, in connection with St. Lawrence Seaway development, Hawkins Point, N. Y., for New York State Power Authority; Walsh Construction Co., New York, low on general contract.

570 tons, bridge work, state thruway, Broome county, New York; bids closed.

500 tons, alterations, Lumberman's Mutual Insurance Co., Philadelphia; bids closed Oct. 9.

450 tons, service station, Philadelphia Electric Co., Norristown, Pa.; bids Oct. 18.

425 tons, angles, 8 to 16-ft lengths, Air Force Depot, Topeka, Kans.; bids Oct. 21, Inv. 107-B.

425 tons, Glenco dam power plant; bids to Bureau of Reclamation, Casper, Wyo., Nov. 2; Schedule No. DC 4255.

335 tons, two state bridges, Fall River-Boston expressway, Fall River, Mass.; bids Oct. 14, Boston.

300 tons, state thruway, Sullivan county, New York; bids closed.

140 tons, Pine Point crossing, Boston & Maine railroad, state route 9, Scarboro, Me.; bids Oct. 13, Augusta, Me.

REINFORCING BARS . . .

REINFORCING BARS PLACED

850 tons, section, state turnpike, Montgomery county, Pa., through Lane Construction Co., Meriden, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

375 tons, bridge foundations, Maine turnpike extension, Gardner-Hollowell, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Theodore Loranger & Sons, New Bedford, Mass., general contractor; Owen J. McGarrahan, Boston, erection only. 655 tons, fabricated structural steel.

365 tons, section, state turnpike, Bucks and Lehigh counties, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

355 tons, bridge foundations, Maine turnpike extension, Webster-Litchfield, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Theodore Loranger & Sons, New Bedford, Mass., general contractor;

Owen J. McGarrahan, Boston, erection only, 910 tons, fabricated structural steel.

325 tons, section, state turnpike, Montgomery county, Pa., to Taylor-Davis Inc., Philadelphia.

300 tons, Sunset Electric Co. plant, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle; H. S. Wright & Co., Seattle, general contractors.

165 tons, state bridge, Chester county, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

110 tons, Army warehouse, Ft. Richardson, Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Grove, Shepherd, Wilson & Kruge, Seattle, general contractors.

108 tons, municipal incinerator, Philadelphia, to Taylor-Davis Inc., that city.

100 tons, Washington state highway bridge, Mt. Vernon, Wash., to Jos. T. Ryerson & Son Inc., Seattle.

REINFORCING BARS PENDING

720 tons, Lovewell dam, Missouri Basin project, near Lovewell, Nebr.; bids Oct. 21, Interior Department, Bureau of Reclamation, Superior, Nebr.

2850 tons, Glenco dam power plant, Wyoming; bids to Bureau of Reclamation, Casper, Wyo., Nov. 2.

600 tons, state project, First Ave. south bridge and approaches, Seattle; bids to Olympia, Wash., Oct. 19.

525 tons, section, state turnpike, Montgomery county, Pa.; Latrobe Construction Co., Pittsburgh, low on general contract.

300 tons, (possibly up to 1200 tons depending on design) Seattle warehouse; bids in to Boeing Airplane Co., Seattle.

285 tons, 2.5-million-gal. reservoir, Ft. Richardson, Alaska; L. & L. Construction Co. and M. B. Contracting Co., Seattle, low at $462,426 to U. S. Engineer

165 tons, Corning canal; bids to Bureau of Reclamation, Red Bluff, Calif., Oct. 20; DC4256.

125 tons, two barracks, Ladd Air Base, Alaska; Peter Kiewit & Sons Co., Longview, Wash., apparently low at $1,161,930 to U. S. Engineer.

100 tons plus, Oregon state bridges and underpass, Lane and Marion counties; general awards to Tom Lillebo, Reedsport, Oreg., at $153,472 and $102,440, respectively.

100 tons plus, eight ammunition igloos, Elmendorf Air Base, Alaska; bids to U. S. Engineer, Anchorage, Alaska, Oct. 22, schedule No. 55-33.

100 tons, state bridges, Fall River-Boston expressway, Fall River, Mass.; bids Oct. 14, Boston.

100 tons plus, flight simulator training building, Elmendorf Air Base, Alaska; bids to U. S. Engineer, Oct. 22; No. 55-32.

100 tons, Youngs Lake guided missile launcher and control, Washington state; Cisco Construction Co., Portland, Oreg., low at $394,152 to U. S. Engineer, Seattle.

100 tons, guided missile project, Midway, Wash.; John P. Hopkins, Mercer Island, Wash., general award by U. S. Engineer at $365,153.

PLATES . . .

PLATES PLACED

36 tons, 20 mobile refrigerator units for Hawaiian Island interest, to Fiohr & Son, Seattle.

PLATES PENDING

600 tons, two 1.2 million gal. steel reservoirs, Worcester, Mass.; bids Oct. 13, city manager.

850 tons, tunnel liner, surge tanks, penstock and outlets, Glenco dam project, Wyoming; bids to Bureau of Reclamation, Casper, Wyo., Nov. 2.

300 tons, 1 million-gal. elevated water tank, veterans' hospital, Hines, Ill.; bids Oct. 19, director, construction service, Veterans' Administration, Washington.

RAILS, CARS . . .

RAILROAD CARS PENDING

Alaska Railroad, 100 units, 70-ton ballast and coal cars; bids to General Services, Seattle, Oct. 25.

Transportation Corps, Marietta, Pa., two-hundred-two 10,000-gal tank cars; bids Oct. 22.

SELL NOW
Free Service. For Sale Your Excess Steel Inventory.
All types, surplus Wanted
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Stainless—Aluminum—Steel—Brass
Any size type and quantity. Cash for termination inventories.
Send list to:
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9050 Washington Blvd. Culver City, Calif.

WANTED
SQUARING SHEAR—Used, in good condition ¾" or 1" Steel Plate—8 to 10 feet width. Will consider down to 3 feet width. Prefer Cincinnati. Reply Box 138, STEEL, Penton Bldg., Cleveland 13, Ohio.

WANTED
SURPLUS AIRCRAFT PARTS
or termination inventories.
Get our cash offer by return mail.
Send lists to:
COLLINS ENGINEERING COMPANY
9050 Washington Blvd. Culver City, Calif.

CLASSIFIED

Help Wanted

PLANT SUPERINTENDENT for Structural Steel plant located in South fabricating structural steel and miscellaneous iron for buildings, bridges, etc. Shop employs approximately 250 men. Advise full experience, age, and qualifications in first reply. Real opportunity in a substantial long established firm. Reply Box 131, STEEL, Penton Building, Cleveland 13, Ohio.

INDUSTRIAL SALESMAN OR SALES TRAINEE—Age 25-35—for established supplier furnishing basic raw material to the iron and steel industry—metallurgical education or knowledge of iron and steel melting helpful, but will consider others. Will require travel with headquarters in Ohio. Salary commensurate with experience plus expenses. Reply Box 135, STEEL, Penton Building, Cleveland 13, Ohio.

Positions Wanted

PLANT AND PRODUCTION MANAGER, Engineering Graduate (M.I.T.) indoctrinated in practical operating experience. Proven record of accomplishment in efficient plant supervision, control, and cost reduction coupled with amicable labor relations. Reply Box 134, STEEL, Penton Building, Cleveland 13, Ohio.

ESTABLISHED MANUFACTURERS' AGENCY with forging following wishes to represent in Northern Ohio area a Hammered and Pressed Forging Company, with turning, boring and heat treating facilities. Reply Box 137, STEEL, Penton Building, Cleveland 13, Ohio.

INDUSTRIAL SALESMAN, Pittsburgh Tri-State district thirteen years. Wide acquaintance industrial, steel, coal companies, and industrial distributors. Technical background. Desires opportunity in sales. Reply Box 128, STEEL, Penton Building, Cleveland 13, Ohio.

MECHANICAL ENGINEER: Metallurgical background; desires sales opportunity handling repeat product in Pittsburgh District. Reply Box 139, STEEL, Penton Bldg., Cleveland 13, Ohio.

RAILWAY EQUIPMENT
FOR SALE
Used — As Is — Reconditioned
RAILWAY CARS—
ALL TYPES
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FREIGHT CAR REPAIR PARTS
For All Types of Cars
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Diesel, Steam, Gasoline
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New 1944—Reasonably Priced
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To Rent or Purchase
MULTIPLE PUNCH
1" capacity with spacing table.
Must be priced right.
Write or Call
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Camden, N. J.

WANTED
Experienced man to handle an Electric Welded Tube Department. Must be capable of handling men, training operators and producing high quality tube on modern mills. Good opportunity for advancement for the right man.
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Penton Building Cleveland 13, Ohio

This Holcroft Book belongs in YOUR Technical Library

"We are going to invest in our own heat treat furnace. Where should we start—what furnace facts should we know?"

"Do we know the difference between 'direct' and 'indirect' firing?"

"Do we know all the methods of handling stock, and which would best suit our needs?"

Questions like these are best answered by a manufacturer who specializes in building furnaces for specific jobs. You'll find the answers —compiled from a world of experience—in Holcroft's book "Blazing the Heat Treat Trail."

For example, there's a frank discussion of all of the basic factors that govern the selection of a furnace: the fuel to use, a discussion of open firing versus controlled atmospheres, an illustrated section on stock handling, and suggestions as to how your heat treat process can be tied right into the production line.

This book represents the type of industry service that stamps Holcroft as its leader. As continuing sources of information, future advertisements will further describe different furnace types and methods of handling stock.

You'll find it's a good bet to come to Holcroft first!

Want a copy of this book for your files? Just write—right now!

Holcroft & Company, 6545 Epworth Blvd., Detroit 10, Michigan.

HOLCROFT & COMPANY — PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

6545 Epworth Blvd. **Detroit 10, Michigan**

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Red Circle Rolls for all Purposes

Hyde Park Red Circle Rolls are outstanding in quality and in performance and are easily identified by the Red Circle.

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finer finish
long life
greater tonnage
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Chilled Rolls
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Moly Rolls
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Sand Rolls

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Hyde Park, Westmoreland County, Pa.

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Producers of alloys, metals and chemicals

Two Vancoram Manganese Products for Superior Steel and Iron:

Silicomanganese Alloys
Ferromanganese Briquettes

These two versatile Manganese alloys, members of the Vancoram family of products, were each carefully developed to help steel and iron makers produce metals of the highest quality with maximum efficiency.

VANCORAM SILICOMANGANESE ALLOYS, available in three grades, are valuable additions to both steel and cast iron . . . serving as a furnace block, deoxidizer, desulphurizer and source of manganese. These alloys are noted for their purity and uniformity of composition.

Carbon	Manganese	Silicon
1.50% max	65/68%	18/20%
2.00% max	65/68%	15/17.5%
3.00% max	65/68%	12/14.5%

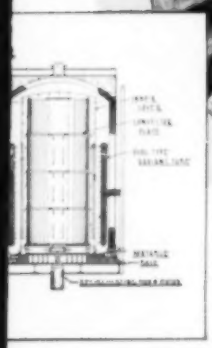
VANCORAM FERROMANGANESE BRIQUETTES are recommended for use in iron as a manganese addition agent and also as a desulphurizer. Their shape is oblong for swift identification, their weight is approximately 3 pounds per briquette for easy handling, and their manganese content is exactly 2 pounds for simple addition without weighing.

The Briquettes are furnished in convenient palletized form, if required, thus simplifying handling and storage and reducing contamination.

Whether you make your additions to furnace, cupola or ladle . . . you'll consistently get better, more uniform results when you use Vancoram Silicomanganese Alloys or Vancoram Ferromanganese Briquettes.

here's the amazing "O" tube

that reduced annealing costs



The remarkable efficiency of the Lee Wilson Single-Stack Portable-Base Annealing System is due in a great degree to the new "O" type radiant tube. The tube, developed by Lee Wilson especially for the bell type furnace, is an engineering accomplishment.

The design of the tube allows greater length of flame travel and the fuel application is so arranged that the principal heat release is in the bottom of the tube. The flame, however, is continued around the top elbow, changing the direction of the gas flow, keeping the primary combustion near or on the tube surface, effecting more efficient heat transfer. The sharp turns designed into the tube not only make it a compact, space-saving unit but create a gas turbulence at the elbows that promotes more rapid combustion; thus, more of the tube is working. The "O" Tube has a much greater dispersion area than other tubes and can operate at an input of 500,000 BTU per tube, per hour.

The design of the tube also permits perfect blanketing of inner cover, speeding heating time and eliminating hot and cold spots. Structurally, the tube has the advantage of not requiring holes in the furnace arch and but one opening in the side wall. It is free to expand in every direction, preventing excessive force which might crack the joints.

There's a lot more to the story! Performance records prove this tube has no equal when it comes to quality production annealing. It's the furnace of the future – here today. Brochure and data sheets available upon request.

Lee Wilson

ENGINEERING COMPANY, Inc.

20005 WEST LAKE ROAD, CLEVELAND 16, OHIO

TIMKEN® TQIT roll neck bearings in new United 4-hi, 4-stand mill give interference fit with easy removal

ALAN WOOD Steel Company's new 4-hi, 4-stand tandem cold reduction mill, built by the United Engineering and Foundry Company, uses Timken® 4-row tapered bore tapered roller bearings on the back-up rolls.

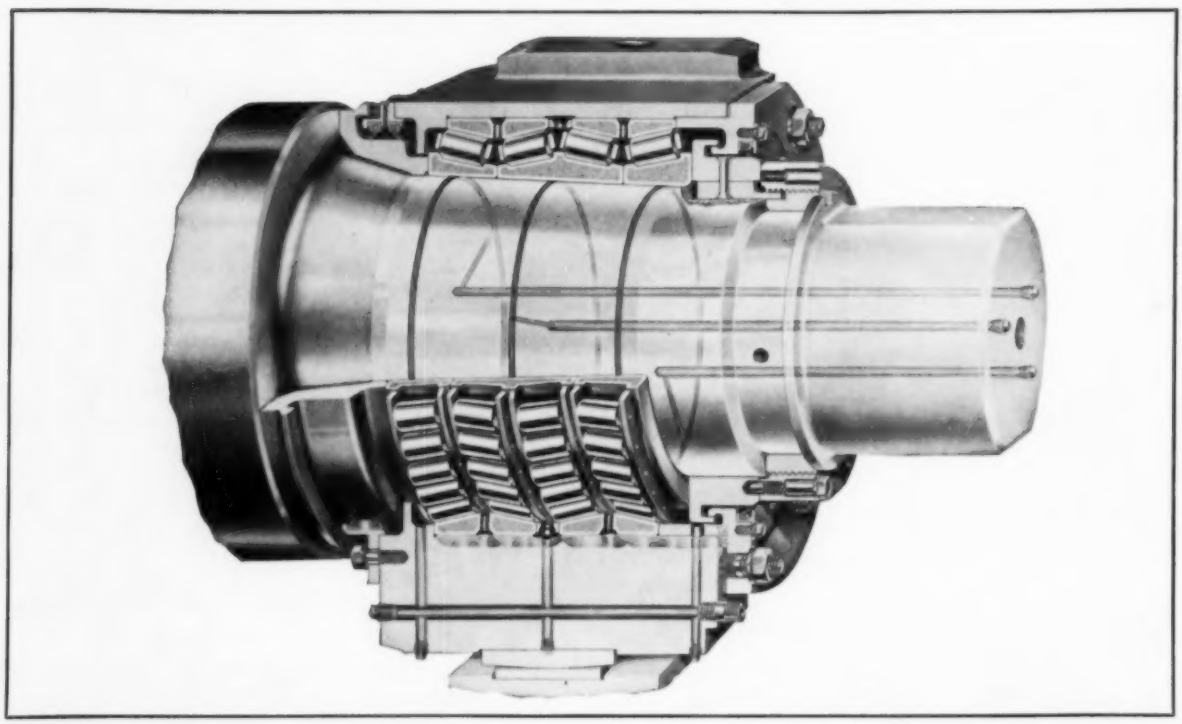
This new roll neck bearing combines maximum bearing capacity and interference fit with easy removal. It can be quickly removed from the roll neck by expanding its cones hydraulically. Excessive scuffing and neck wear are eliminated. The interference fit of the cones with the roll neck provides greater stability between cones and roll neck and gives better load distribution within the bearing. It also permits improved fillet contours and larger necks. Result: lower neck stress and deflections than any other arrangement.

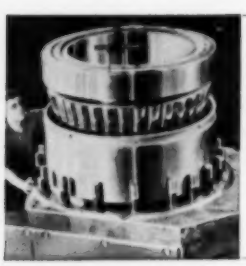
Timken bearings use economical grease lubrication. There's no loss of lubricant during roll changes. Rolls can be changed faster because there are no pipes or tubes. And there's no need for special thrust bearings because the tapered construction of Timken bearings lets them take radial and thrust loads in any combination.

With Timken bearings, higher mill speeds are possible, and starting resistance is reduced to a minimum so there's no roll scuffing or scoring of steel. That's because Timken bearings practically eliminate friction—design, by geometrical law, gives them true rolling motion . . . and they're made extremely accurate to live up to their design.

Get all the advantages of the Timken TQIT bearing in your mill. For more information, write The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.





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Our field and service engineers have had years of experience with problems of roll neck bearing design and operation. They'll help you select bearings and design mountings.

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